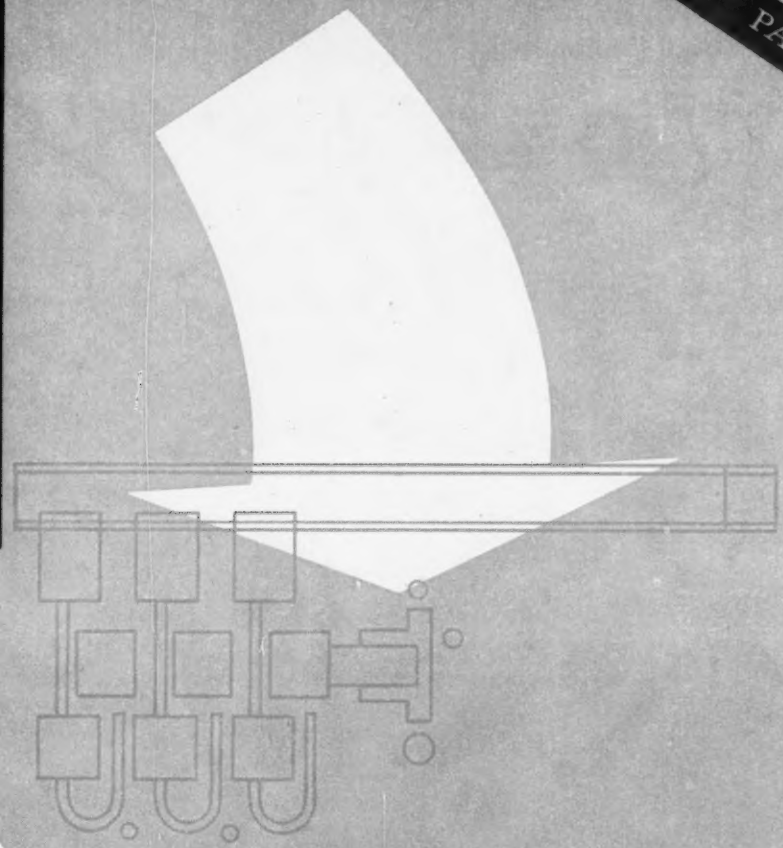
MAY 1961

Material Handling Engineering

Established in 1945 as FLOW Magazine

PART I



GUIDE TO IN-PROCESS HANDLING

The Equipment Design Battle — Manufacturer Vs You

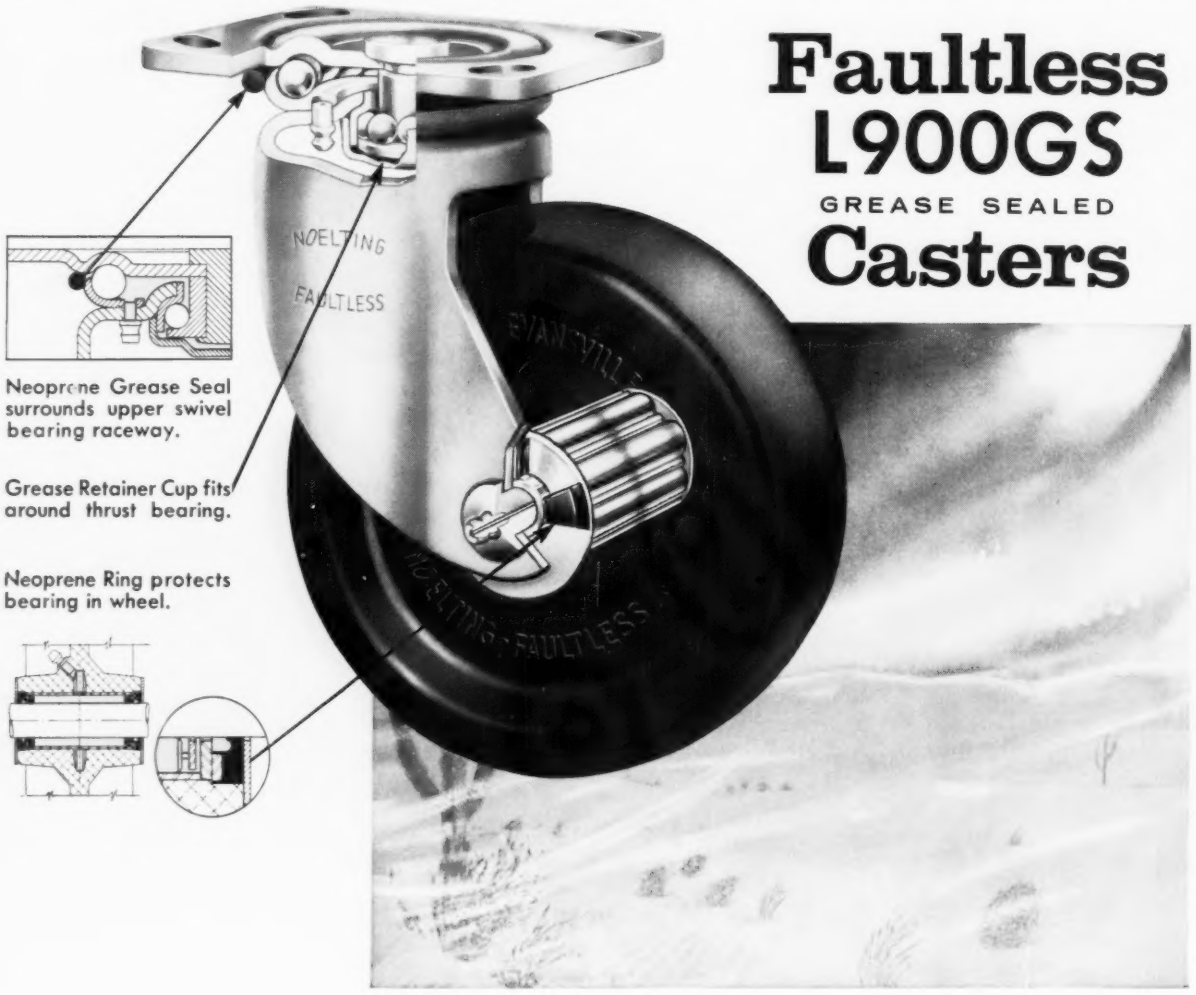
mhe

THE MAGAZINE OF MATERIAL FLOW MANAGEMENT

Material Control — Key to Manufacturing 48
Control In-Process Flow Automatically 67
Keep Up With The Handling/Packaging/Marking Speedup .. 80

Where it's Gritty, Hot, or Corrosive, use

Faultless L900GS GREASE SEALED Casters



Grease Seals keep lubricant in . . . keep out dirt, dust, sand, steam, etc.

Faultless L900GS Grease Sealed Casters are designed to keep rolling, with minimum maintenance, in working areas where gritty particles, or harsh chemicals would damage ordinary casters. Neoprene Grease Seal and Grease Retaining Cup around Double Ball Bearing Swivel, plus Neoprene Ring around wheel bearing, give positive protection against materials that would clog caster movement, cause friction and wear. Companion L9700GS Rigid Grease Sealed Caster is available with matching specifications and sizes.

Your Faultless Industrial Distributor, or nearby Faultless Sales Engineer can supply you with detailed information on the L900GS, as well as the other casters in the complete, quality-tested Faultless Caster line. Also, your Faultless Distributor stocks casters at his warehouse for immediate shipment.

Faultless Caster Corporation Evansville 7, Indiana

Branch Offices in principal cities; see the Yellow Pages of the telephone book under "Casters." Canada: Stratford, Ontario.

Circle 48 on Reader Service Card

NOELTING
Faultless
Casters

New CROSS-RIB has up to 60% thicker tread for longest life in your plant's roughest going

Here's the great new Cross-Rib Pneumatic Industrial Tire—its tread *as much as 60% deeper* than ordinary pneumatic industrials. Result: tread bars that really dig in for faster, nonspin starts—safer, nonskid stops—sure-footed travel in between.

The new Cross-Rib is made from super-toughened rubber compounds that fight gouging, abrasion and wear. And its body is muscled with Goodyear's exclusive 3-T Process Cord—for maximum strength and resistance to shock and fatigue.

For full facts on this latest addition to the No. 1 family of industrial tires—pneumatics and solids—see your Goodyear dealer.

Or write: Goodyear, Industrial Tire Sales, Akron 16, Ohio. Lots of good things come from Goodyear.

INDUSTRIAL TIRES BY

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Circle **57** on Reader Service Card

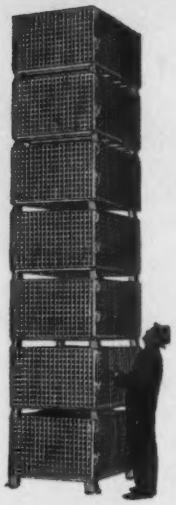
'Junior' Model 3220
32" long, 20" wide by 16" high—with fold-down feature. 500 pound capacity.

'Junior' Model SGC-3220
32" long, 20" wide by 16" high with reinforced Type C Side Gate, fold-down feature. 500 pound capacity.

'Junior' Model 2016
20" long, 16" wide by 12" high, no fold-down feature. 200 pound capacity.

'Junior' PALLETAINERS

SOLVE ASSEMBLY LINE PROBLEMS



Regular Palletainers and 'Juniors' alike save valuable floor space. They stack higher with complete safety. Contents always protected—always visible.

Got a production problem? Whether it's a pressroom, foundry or assembly line, you will find the new 'Junior' Palletainers are the practical, inexpensive *answer* you've been seeking. See, here, how these versatile, engineered parts containers find key places for themselves!

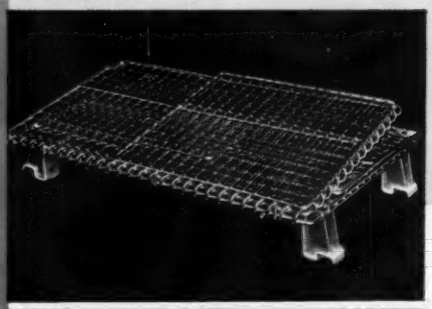
'Juniors' are a "natural" for stampings, finished parts, delicate components—even rough forgings. They can be moved quickly, easily—anywhere. Special fabricated leg design permits faster, safer, higher stacking as well as full 8-way fork truck entry. They're reinforced, electro-welded steel rod construction . . . virtually indestructible.

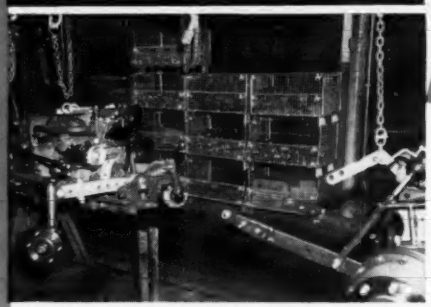
Try a few *sample** 'Juniors' in your plant, and see for yourself how easily they save your time, space and equipment dollars.

'Junior' Model SGC 3220—Most popular model of the 'Junior' line is equipped with a Type C side access gate for greater convenience on the line, warehouse or temporary storage.

'Junior' Palletainer models **3220** and **SGC-3220** (with gate) fold down quickly and easily to save over 75% of the open area.

A typical example of how 'Juniors' are used to temporarily store and protect delicate electrical components. Special leg design makes stacking fast and safe.





Palletainer 'Juniors' help speed production—assembly line operations. Photo above illustrates one plant's method of handling precision components right in the 'line' work area. Side gate eliminates long reach and products are always clean, visible—easily accessible.

'Juniors' afford a new concept in on-the-spot part bin selection convenience. Units stack at any convenient location and side access gates may be opened without affecting the strength or rigidity of the unit.

Anything . . . absolutely **anything** retained by 1⅛" mesh can be more effectively, economically and safely stored in USP Palletainer 'Juniors'. 'Juniors' eliminate old style bins, boxes and barrels—and take the guess-work out of warehouse parts selection.

SPECIAL OFFER

Try these tested, proved-in-service containers on a 60 day memo billing basis. Your obligation is freight, only. Also—write today for additional Palletainer information to meet your special handling needs.

UNION STEEL PRODUCTS CO.

400 N. Berrien St. • Albion, Michigan

Palletainers are also manufactured under license by: BANNER METALS, INC., Compton (Los Angeles), California; and Croname LTD. Waterloo, Quebec, Canada

Circle **111** on Reader Service Card

reader's guide to

MAY 1961

Material Handling Engineering

volume 16 number 5

Established in 1945 as FLOW Magazine

GUIDE TO IN-PROCESS HANDLING 47
An introduction: The place of material flow in manufacturing.

MATERIAL CONTROL—THE KEY TO MANUFACTURING 48
Techniques for controlling in-process inventory.

EVALUATING AND PLANNING A MECHANIZATION PROGRAM 51
Answers the *when*, *where*, and *how* of mechanization.

HOW TO COUNT YOUR PROFITS BEFORE THEY HATCH 54
Methods of costing a mechanization program and presenting it to management.

HANDLING—ASSEMBLY'S TWIN BROTHER 58
Two viewpoints on setting up a handling-oriented assembly line.

A SHAPE OF THINGS TO COME? 62
A robot device that can be taught new tricks is a new assembly tool.

CONTROL IN-PROCESS FLOW AUTOMATICALLY 67
Factors in material flow that can be translated into automatic handling.

EQUIPMENT DESIGN BATTLE: MANUFACTURER VS. YOU 70
User and vendor lock horns over product design and cost.

CHOOSE THE RIGHT SCRAP HANDLING SYSTEM 75
A look at one of the toughest handling jobs in manufacturing.

KEEP UP WITH THE HANDLING/PACKAGING/MARKING SPEEDUP 80
The new speeds that are available in this field—and how to use them wisely.

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FREE 2 VALUABLE GUIDES

TO AID YOU WHEN SELECTING PNEUMATIC CONVEYING AND BULK STORAGE TANKS

BULLETIN M-260—12 page DAY pneumatic conveying guide just off the press. Discusses types of systems, illustrates and diagrams high and low density arrangements, shows equipment and tells "why" and "wherefore" of all types of pneumatic conveying including so-called fluidizing systems.

BULLETIN 574—12 pages, describes horizontal and vertical storage tanks. Points out savings and is filled with photos of various installations plus description of auxiliary equipment.

Whatever your pneumatic conveying or bulk storage problem, look first in these DAY bulletins. They are valuable aids in selecting and ordering the right equipment for your plant. For your free copies use reader service card of this magazine or write direct toDAY.

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☐ Send Bulletin M-260 ☐ Send Bulletin 574
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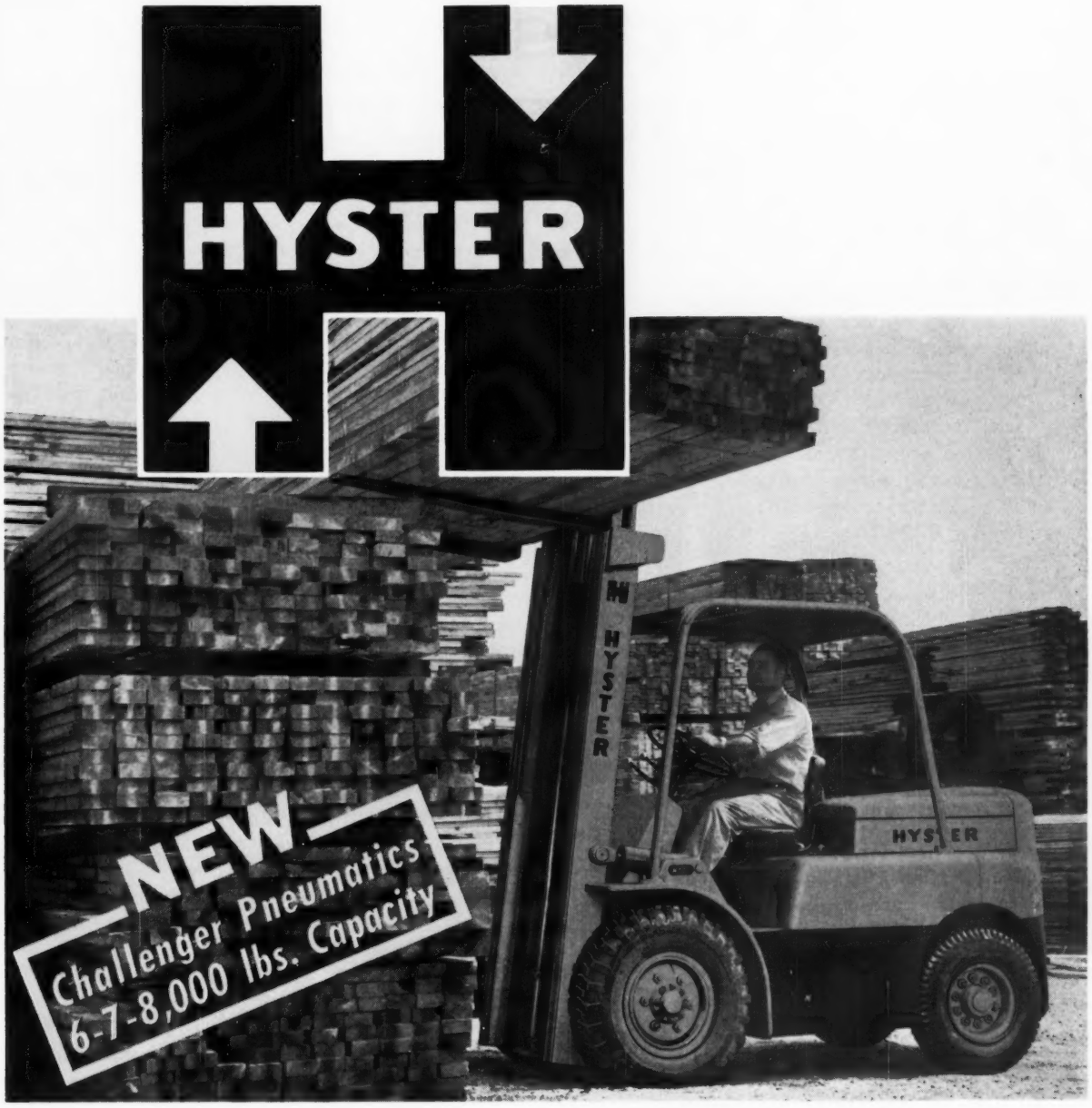

Two-speed hoist boosts production by 20%

Only

HYSTER® has it!

Compare these cost-cutting *exclusive* features of the new model HYSTER Challenger 60, 70, 80 trucks.

Two-speed hoist system for fast lift with full load —automatic double-speed with partial loads.

Long-life oil clutch gives smoothest operation, trouble-free service up to 10,000 hours.

Full-time full-flow hydraulic filter filters all of the oil all of the time—eliminates troubles caused by dirty hydraulic oil.

Shortest turning radius in the 6,000-8,000 lb. capacity class.

Ask your Hyster dealer to demonstrate the advanced features that set the engineering pace for *all* lift trucks. Call him soon or write for literature.

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INDUSTRIAL TRUCK DIVISION
P. O. Box 847 Danville, Illinois

Circle **63** on Reader Service Card

NEWS ROUNDUP

Wunsch award winners

WINNERS OF THE WUNSCH AWARDS for the best research papers on material handling are:

First prize—Russell F. Collum, operations manager, Standard Oil Co. of Ohio, for "Material Handling Facilities Improvement."

Second prize—Ronald E. Diamond, production control manager, Meyer Products, for "The Importance of Plant Layout in Material Handling."

Third prize—Eugene R. Liebchen, industrial engineer, Harris-Seybold Division, Harris-Intertype Corp., for "The Purchase of a 6,000-lb. Electric High Lift Platform Truck."

At the awards presentation ceremony are (left to right) Robert D. Houle, Fenn College material handling instructor, Liebchen, Collum, Diamond, and Nicholas R. Rimboi, director of Fenn College's Technical Institute. The awards are sponsored by the Wunsch Silent Hoist and Crane Co., New Jersey.

Buy storage racks on time

STURDI-BILT MATERIAL HANDLING DIVISION, Union Asbestos & Rubber Co., Chicago, announces a new time-pay plan for storage racks. Vice President B. G. Metzger says the plan allows rack buyers to buy cost cutting equipment without a large capital outlay. He says monthly payments will be lower than the savings from use of the racks. The first investment may be as low as 10 percent, with as long as five years to pay. Payments are on a monthly basis.

New gasoline carburetor program

MARVEL-SCHEBLER PRODUCTS DIVISION, Borg-Warner Corp., developed 13 new universal gasoline carburetors to replace 450 in the industrial engine and tractor markets. This simplifies stocking, enabling dealers to offer immediate service. Marvel-Schebler says a dealer can stock for less than $200 list. The new carburetors are factory calibrated, need no adjustment. They're easily installed with no other parts to buy.

More research on fuel cells

A JOINT RESEARCH PROGRAM on fuel cells and fuels has been contracted between Gould-National Batteries Inc. and the Pure Oil Co. Program director is Gould's Dr. Royce E. Biddick, a specialist in fuel cell research. Said Gould Chairman Albert H. Daggett: "We initiated this program to develop a practical power generator that will compete on even terms with older forms of power production, such as the internal combustion engine. Now, because of widespread interest in these cells, our program has been accelerated. However, much experimental work remains before the fuel cell can be practically applied to any important extent."

New courses at National Training Center

THE MHEDA NATIONAL TRAINING CENTER in Newport, Rhode Island, has these material handling courses planned for the near future:

May 8-12—Brewery and Distribution Warehouse.

May 22-26—Food Canning and Processing.

June 19-23—Paper Industry Distribution.

July 10-14—Department Store.

For a complete list of subjects, lecturers, and course details, write to Director Harry Freeman, National Material Handling Center, 61 Narragansett Ave., Newport, Rhode Island.

Sees European veto of standard

JOHN R. IMMER reports Western Europe may turn thumbs down on 8-ft.-wide containers. Reason: concern over highway deaths has led Europeans to consider drastic limitations

Continued on page 10

ALLIS-CHALMERS

Lift Truck Attachments

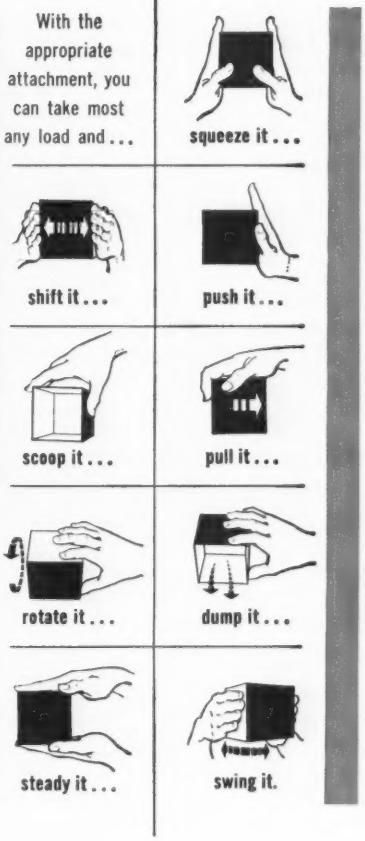
Put the HAND in "Handling"...

NEW! NEW! Carton Clamp

exerts equal pressure over entire surface to grip firmly without crushing. Arms are knife-thin — side shifting is standard.

WILL BE SHOWN AND DEMONSTRATED FOR THE FIRST TIME at the Material Handling Show in Philadelphia, May 9-11, Booth 326.

With the appropriate attachment, you can take most any load and...



Owners find a big dollar-saving difference in the performance, ease of servicing, and over-all durability of Allis-Chalmers lift trucks.

And these advantages are not confined to routine pallet-handling jobs, either. The full line of easy-to-mount attachments makes Allis-Chalmers lift trucks almost as flexible as your own two hands.

Have your Allis-Chalmers dealer show you how the right attachment quickly pays for itself by extending the usefulness of the lift truck — by moving a larger volume of material and by reducing damage. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

BH-168

Circle **2** on Reader Service Card

FROM CATERPILLAR—

An announcement about a new line of wheel loaders for all types of bulk material handling

These new machines—Caterpillar wheel Traxcavators—will likely more than meet your requirements of maneuverability, safety, speed *and* production—should set new standards of output, handling costs and dependability in your plant.

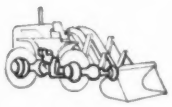
For a year now they've been at work in industrial plants, quarries, aggregate plants, coal stockpiles and construction. There has been unprecedented praise from their new owners . . . confirming seven years of development and testing.

And there's more behind these Traxcavators than painstaking development: they are built by a manufacturer with 23 years' experience in loaders, twenty years' know-how with heavy wheel tractors and more than a half-century background in building the finest construction and earthmoving equipment.

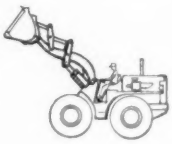
HOW ARE THEY DIFFERENT?

The difference begins with our basic design and manufacturing concept. It's not enough just to build a machine that can deliver satisfactory production for its owner. For a machine to be a "good buy" it must be able to produce at low cost over a long period of time. That's why we build machines to withstand the toughest work in the world . . . and with an endurance margin to boot.

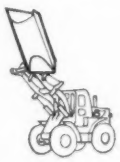
The difference is most obvious in the Traxcavators' performance, and look at the reason for it. A Traxcavator operator is a fortunate man. He mounts his machine by going up three wide steps, no climbing over tires or struggling up ladders. There are fenders to protect him. The operator's area is arranged to make him comfortable, confident. Power shift transmission, automatic bucket positioners, power-boosted steering and brakes do the hard work for him, let him give his attention to handling the material.



He can see where he's going and he can see what he's doing. Visibility on a Traxcavator is excellent, unsurpassed. Safety men notice that the bucket lift arms and hydraulic pistons are all in front of the operator; he's not worried by mechanisms moving up and down on each side of him. And putting the bucket lift arms in front of the operator gives Traxcavators extremely long reach to fill hoppers and bins several feet from the machines: The smallest Traxcavator, the 922, reaches out nearly three and a half feet with a maximum lift over 11 feet . . . the 944 over four feet . . . and the 966, largest of the machines, reaches nearly five feet, lifts nearly 13 feet.



There are buckets to handle any weight or type material. There's a side-dump bucket that permits the Traxcavator to operate in areas even too narrow to turn—a feature offered exclusively by Caterpillar. There are fiber-glass cabs for cold weather operation. There are forks for palletized materials and always special configurations available to fit your needs.



WHAT ABOUT POWER?

Cat wheel loaders offer a choice of Caterpillar Diesel Engines or gasoline engines on the two smaller models.

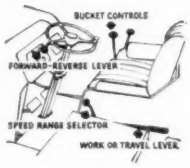
922—1¼ cu. yd. standard bucket—80 HP

944—2 cu. yd. standard bucket—105 HP

The big 966 is powered by a Caterpillar D333 turbocharged Diesel Engine.

Cat 4-cycle Diesels have long been famous for their dependability and simple maintenance. They run on economical furnace oil—will burn premium fuels, too, but they're not required. They have optional independent gasoline starting engines for sure starts in outside winter operations. Easy, direct-electric starting is standard.

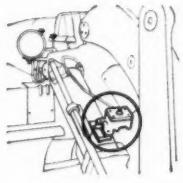
ARE THEY MANEUVERABLE?



They're unsurpassed. Power steering on all three loaders twirls them around in a 21′ turning radius, yet gives sure control for high-speed traveling. The 966 offers dual-ratio steering which allows full turns with only a half turn of the wheel, plus safe, automotive type control for highway travel.

Aisle space? The 922 needs only seven feet; the two larger machines slightly more.

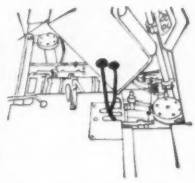
Dual brakes on all three Traxcavators give operators a choice of braking the machine with transmission engaged, or, using the other pedal, stopping the machine *and* disengaging the transmission . . . allowing full engine power to go into the hydraulics.



Maneuverability is increased by the automatic bucket controls, too; a quick touch on a control lever automatically sets the bucket at the correct loading angle; a push on the other lever starts the bucket up; it *stops* automatically at a pre-set carry position. This is all done *for* the operator; he can give plenty of attention to maneuvering the Traxcavator to get the material moved quickly.

These features make good operators all the better and they help the owner, too. If a machine is easy to control, the operator will get more of the work potential out of the machine at the end of a shift as well as at the beginning.

HOW IS THE SERVICE?



Caterpillar Dealers are accustomed to providing service around the clock and around the countryside. Our earthmoving customers go where the work is. And they expect service *wherever* they are. And they expect it fast. Cat Dealers have a reputation of seeing that they get it. It's expert service, too, because these servicemen are thoroughly trained. They know the machines they work on, and they know how important it is that those machines keep running.

Genuine Cat parts are always available. The Traxcavator you buy today will have a parts stock behind it as long as you're using that machine.

WOULD YOU LIKE MORE INFORMATION?

We'd be happy to send you more information and complete specifications on any or all of the new Caterpillar wheel loaders. Just send in the coupon, or, better yet, look in the Yellow Pages and call your nearby Caterpillar Dealer. You'll meet a man with some good answers to material handling problems and some surprisingly good news about the low cost of wheel Traxcavators.

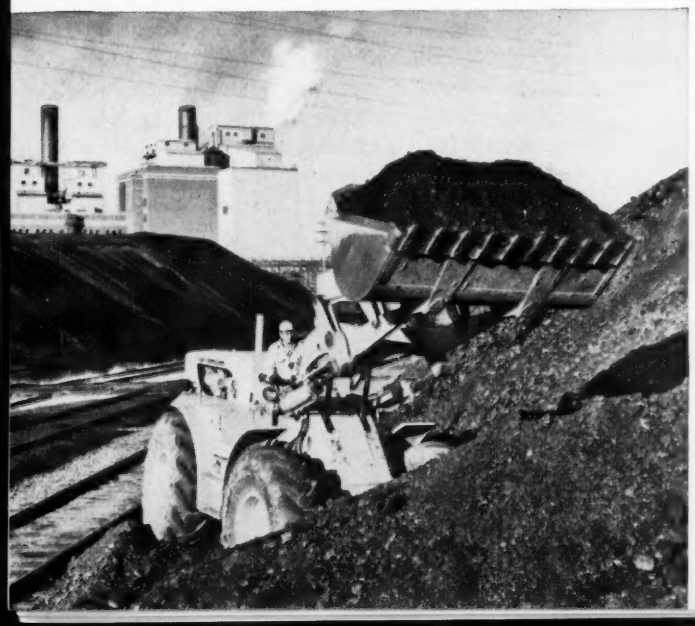
Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

TRAXCAVATORS ARE MAKING OTHER LOADERS OBSOLETE

966—2¾ cu. yd. standard bucket—140 HP



CATERPILLAR TRACTOR CO.
Dept. L-192, General Offices, Peoria, Illinois, U.S.A.

Gentlemen: Please send me information on Traxcavator wheel loaders for industrial bulk materials handling.

I am particularly interested in the _____ (model number)

for handling _____ (names of materials regularly handled)

_____

We presently use: _____ (type of equipment) _____ (model)

_____ (bucket size or capacity)

Name _____

Title _____

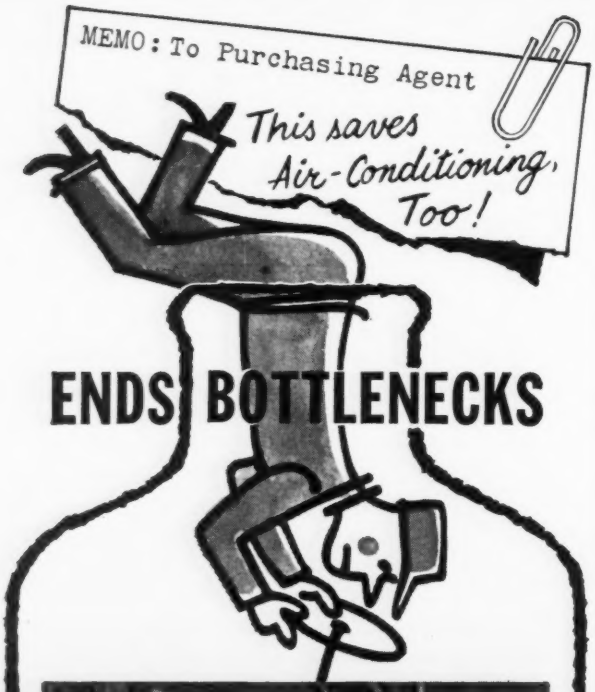
Company _____

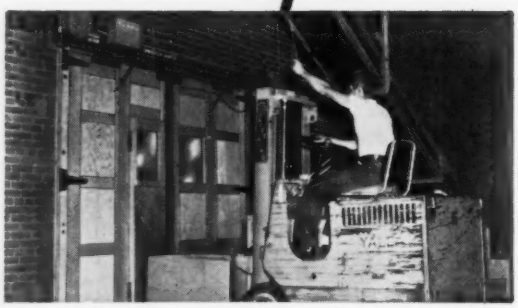
Address _____

City _____ Zone _____ State _____

Telephone _____ Extension _____

Circle 17 on Reader Service Card





The PREST-O-MATIC® Door takes the "STOP" out of "Stop and Go" traffic

Quick-acting PREST-O-MATIC works *for* you, not *against* you. Fully automatic, it prevents slow-downs and bottlenecks — saves you man hours aplenty.

Your fork truck driver simply pulls an overhead cord and goes through the opened door without stopping. The door opens and closes *Prest-O-Matically* in as little as 2 seconds. Compare this with manual doors that require your driver to stop, dismount, open the door, return to the truck, drive through . . . then stop to close the door again! Multiply this waste motion by the number of trips per day . . . per *year*.

Engineered to snug-fit your doorways, PREST-O-MATIC remains tightly closed when not in use. Neoprene Sealing stops drafts, eliminates heat loss.

Complete in one easy to install unit. No extras. Available in Bifold (shown here) and Sliding. You choose the motive power — air or electric. Before you buy any door, get all the facts on PREST-O-MATIC. See our insert in Sweet's Catalog or, better still, write us today.

CLARK DOOR COMPANY, INC. (since 1878)
514 Hunterdon St.
Newark 8, N. J.

Circle 18 on Reader Service Card

NEWS ROUNDUP

on road transport. Immer, chairman of the International Coordination Subcommittee of ASA MH-5 Container Standards Committee, recently returned from a Paris meeting on standard sizes for containers in Western Europe. Immer says the Europeans may recommend their present standards which do not exceed 7 ft. 7 inches in width and the same in height. This, according to Immer, could adversely affect the future container trade of the North Atlantic, particularly that part carried by American ships.

International MH Conference in England

THE 2ND INTERNATIONAL CONFERENCE, sponsored by the Institute of Material Handling, will be May 10-12 in Southport, England. Handling discussions will be divided into four fields: 1) agriculture and food production; 2) extractive minerals and chemicals; 3) heavy industry; and 4) light industry. Two series of factory visits will be held in Cheshire and West Lancashire.

Commerce Department honors Nashua

NASHUA CORP. was cited by the U.S. Commerce Department for contributing to the success of the Office of International Trade Fairs with U.S. exhibits overseas during 1960. The award was for Nashua's exhibit at the Eighth International Fair in Tunis. It featured Package Sealing Division products. Nashua previously exhibited at shows in Dusseldorf, Germany, and Karachi, Pakistan.

Cannon: Distribution needs a manager

SOLVE MISMANAGEMENT of product distribution by establishing a post of Distribution Manager. Rank it with the top jobs in manufacturing and marketing. Let the new man be responsible for everything between production and actual selling—sales order processing, finished goods inventory control, warehousing, finished goods material handling, shipping, traffic, and transportation. This is the position of Philip F. Cannon, vice president of Barrington and Co., speaking at an American Management Association seminar in Saranac Lake, N.Y. He said, in most companies, distribution problems have not received the

Continued on page 12

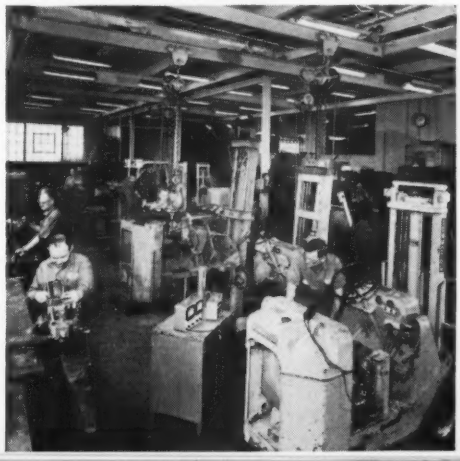
TOWMOTOR'S ON THE MOVE

—providing high speed localized service on a national basis to back up good performance. Preventing unnecessary downtime with same-day service on authorized parts. Assuring continuous operation through well-equipped shops, on-the-spot repairs, emergency stand-by rentals. Keep moving with Towmotor fork lift trucks—made only by TOWMOTOR CORPORATION, CLEVELAND 12, OHIO.

TOWMOTOR
THE ONE-MAN-GANG ®

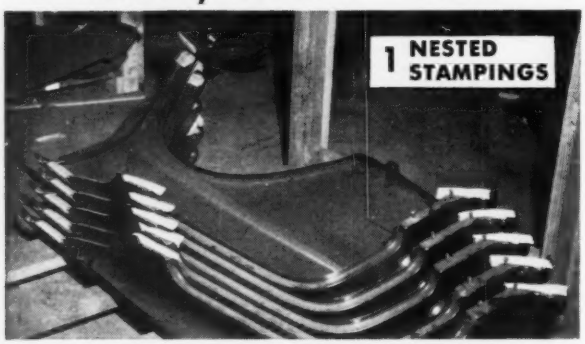
Circle **106** on Reader Service Card

Continuous factory-supervised Preventive Maintenance Service is a popular feature of the complete service program offered by Towmotor representatives from coast to coast. It forestalls repairs, insures peak performance, prevents downtime before it happens. Ask about "P.M." Service.



New Use-Reports Show

HOW EDG-PAK PREVENTS DAMAGE, SAVES MONEY!



1 **Nested Automobile Stampings.** Sharp flanges don't sheer or punch through Edg-Pak's "Strength of Steel" wire inner construction. Adjoining surfaces are fully protected. Edg-Pak doesn't fall off . . . Spring-Grip holds tight—speeds up handling—reduces manpower needs!

2 **Critical Aircraft Edges.** Edg-Pak slips over edges fast. Spring-Grip holds securely. Cushioned 3-way "Strength of Steel" construction improves top, bottom and side protection of critical edge. Reduces damage, speeds handling—Edg-Pak's "Strength of Steel" saves labor and materials!

3 **Steel Strapping.** Prevents sharp edges from cutting through to damage corners or printed surfaces. "Velvet Glove" cushioning prevents marring or scratching. Spring-Grip speeds up both "spot" and length protection applications.

WRITE TODAY!

For New EDG-PAK Card with Sample Materials, Specifications, Price List

FLEX-O-LATORS, INC.,
Carthage, Missouri MHE-5

YES! I want new **EDG-PAK Samples, Specifications and Price List!**

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

Circle **52** on Reader Service Card

NEWS ROUNDUP

comprehensive top-level consideration they deserve. Responsibility has been scattered all over the average corporation, making it impossible for one person to accept full responsibility. Cannon cited two examples of mismanagement: 1—Production wants long runs to minimize its costs, make it look good; but this may run up inventory and handling costs —and 2—Salesmen make unrealistic delivery promises for fear of losing the order, making necessary a warehouse on nearly every corner.

Baker Branch Opening Spotlights Industrial South

"IN THE SOUTHEAST, we are now vitally concerned with labor and money saving devices," contends Dr. Paul Eaton, Georgia Tech's material handling authority (photo, right). Eaton was featured speaker at the open house semi-

ED PATRICK (foreground) points to the operating features of a Baker gasoline-powered fork truck, while Dr. Paul Eaton (right photo) makes a point in discussing the industrialized South.

nar held by Baker Industrial Trucks Division of Otis Elevator Co. at Baker's new branch in Decatur, Georgia.

Confirming this viewpoint of the industrial South, Paul H. Snavely of the Citizens and Southern National Bank in Atlanta spoke on small business financing of capital goods. Other seminar speakers: Ray Witte, insurance and safety specialist on industrial equipment with Employees Group Insurance Co., and Edward Patrick, material handling specialist with Baker (photo, left).

Further evidence of new industrial interest in the area was the 400 guests who visited the branch over a two-day period. They came to attend the seminar, examine and operate the full line of gas and electric trucks, and view the new sales, rental, and service facilities.

Manager of the branch is Marshall Dreitzler, formerly Baker's Atlanta district manager.

NEW 60 RM2 DROTT GO-DEVIL

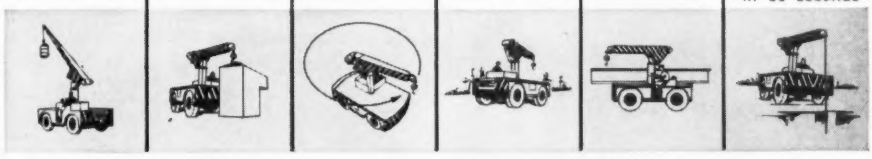
CRANE CAPACITY 6,000 LBS.
DECK CAPACITY 8,000 LBS.

6000 lbs. of Lift

8000 lbs. of Deck Capacity

PUT YOUR IMAGINATION TO WORK ON THESE VERSATILE SPECIFICATIONS

IT REACHES	IT LIFTS	IT SWINGS	IT TRAVELS	IT HAULS	IT CROWDS
25′ up . . . 20′ out	6000 lbs. with safety	360° continuous rotation	up to 19 MPH	on 50 sq. ft. of deck area	extends in 15 seconds, retracts in 11 seconds



This new Drott Go-Devil has the kind of versatility that challenges the imagination of the most cost conscious materials handling man . . . and its applications are limited only by the limits of your imagination . . . you name it . . . it does it.

DROTT MANUFACTURING CORP.
Milwaukee, Wisconsin

Circle **40** on Reader Service Card

Cure: None! (for solid tires in this condition)
Remedy: Smart operators specify MONARCH SOLIDS made with exclusive MONOLOK* process!

Hundreds of industrial tires fail every day because they are used under conditions for which they were not designed. Result . . . dollars lost for downtime, excessive maintenance and early replacement. Consider your requirements . . . do they call for truck operation over loose scrap . . . through brine and acid solutions . . . over rough surfaces . . . or under conditions of excessive heat? These are the critical operating factors that cause premature rim separation. Check with your Monarch representative today . . . he will prove to you that MONARCH MONOLOK tires will last longer in your plant.

10185-MR

*MONOLOK . . . Monarch's revolutionary new process bonds a tough new rubber to metal permanently. Both **Mono-Cushion** and **Universal** tires are made by this method.

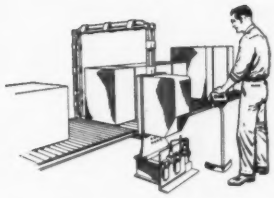
THE MONARCH RUBBER COMPANY
210 Lincoln Park
Hartville, Ohio

923 Firher Building
Detroit 2, Mich.
4140 West Fullerton
Chicago 39, Ill.
Western Warehouse
Reno, Nevada

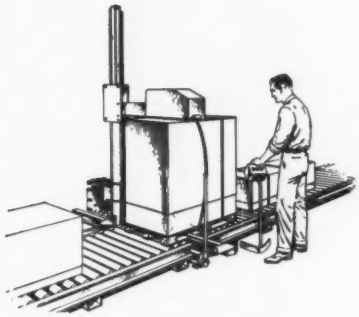
Circle **80** on Reader Service Card

Now, Acme Steel brings you (*literally!*) the world's first strapping machine with

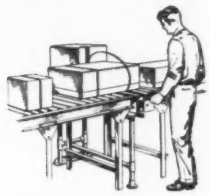
FULL-SIZE PERFORMANCE ...PINT SIZE PRICE



THREE OF MANY



WAYS THE F7



CAN BE USED

THE REVOLUTIONARY **F7** ...so *compact*, we can carry it right into your plant . . . so *complete*, it does everything you want a powered strapping machine for: fast feeding, tensioning, sealing and cutting. And so *conservative in cost!*

The new F7 is not a stripped down facsimile of a larger machine. Its surprisingly low initial cost and operating economy are engineered into the strapping mechanism—a 75 pound, self-contained unit that doesn't rely on complex (and costly to service) electronic circuits. You can adapt it for any regular duty strapping job, equip it for the exact degree of automation you desire (at right are a few of many actual applications).

Now, even modest volume operations can discard outmoded methods. Big users can set up additional strapping lines at a fraction of their former cost. And everyone can give production bottlenecks the slip—the low-cost F7 strapping mechanism can be replaced with a standby in a few minutes!

Call your Acme Idea Man for a quick *carry-in* demonstration. See how the new F7 can handle your packaging operation at a greater profit. Or, return the coupon for full facts.

Circle 1 on Reader Service Card

ACME STEEL **IDEA LEADER IN STRAPPING**

ACME STEEL COMPANY
Dept. MES-51, 135th St. & Perry Ave., Chicago 27, Ill.

☐ I would like an F7 demonstration in my plant.
☐ Send complete information on the new F7.

NAME_____

TITLE_____

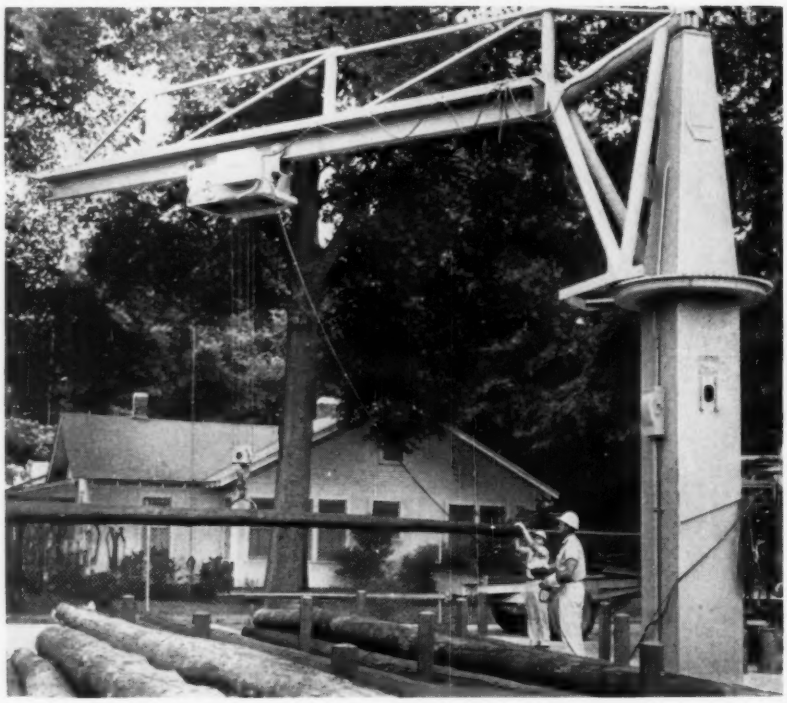
FIRM_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

COST CUTTING IDEAS

Jib Crane and Hoist Save Time and Money



Mississippi Power and Light Company cut costs in handling poles and heavy electrical equipment at service centers. One test: they installed a 4-ton-capacity jib crane and electric hoist at Vicksburg. Results: so good that they added cranes and hoists to improve material handling at their service centers at Cleveland, Marks, Senatobia, and Hazelhurst, Miss.

Pole handling used to take about an hour and 15 minutes for an average load of five poles. The same job takes only one man and two minutes a pole with the crane and hoist.

Savings are greater however in handling transformers. They're received in large quantities. Formerly, they called in a field crew to unload and store. Now one man does it with the jib crane and hoist.

Armed with the jib crane and Hoist, MP & L can build a service center without rail sidings. The last siding installed by the company cost $15,000, more than double the cost of the crane hoist.—*R. G. LeTourneau, Inc.*

Circle **250** on Reader Service Card

Store Highway Salt In Low-Cost Shelter

To give better service to customers, the Cayuga Rock Salt Co., Inc., of Myers, N.Y. has just completed one of the largest pole-type structures in the world at its mine site. It has 60,800 sq. ft. inside floor area.

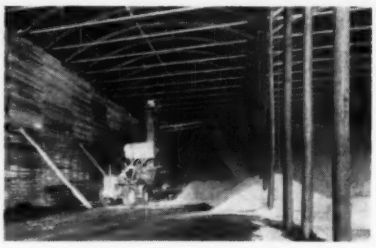
"We chose the pole-barn because of its economy, speed of erection, and relative longevity," says W. S. Randel, general superintendent.

Life of the structure is estimated at a minimum of 30 years. Four hundred 40-ft. creosoted pine poles support the structure. Five columns of poles on 4-ft. centers on exterior and 8-ft. on interior, imbedded 5 to 6 ft. in the ground, form four 50-ft. bays and support the roof.

Cayuga says it put up the 70,000-ton-capacity warehouse at about half the cost and twice the speed of conventional structures of the same capacity.

Previously, salt could not be hoisted fast enough from underground storage vaults in the 2,000-ft.-deep mine to satisfy winter demand. The amount of salt that could be shipped was limited by the hoisting capacity. And you can't store salt uncovered.

The pole-type construction provides storage at a cost of $2 a ton.



Hardwood for the wall was obtained in two lengths. This eliminated cutting on the site.—*Koppers Company, Inc.*

Circle **251** on Reader Service Card

Automatic Packaging

Bauer & Black Company, Division of Kendall Co. of Chicago,

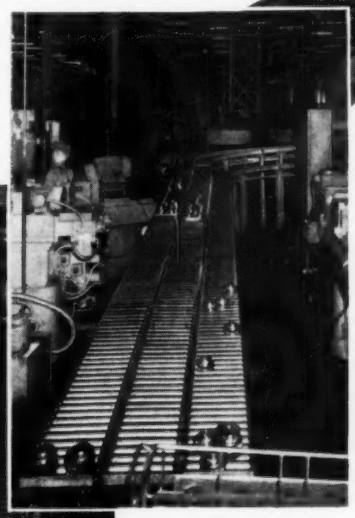
Continued on page 21

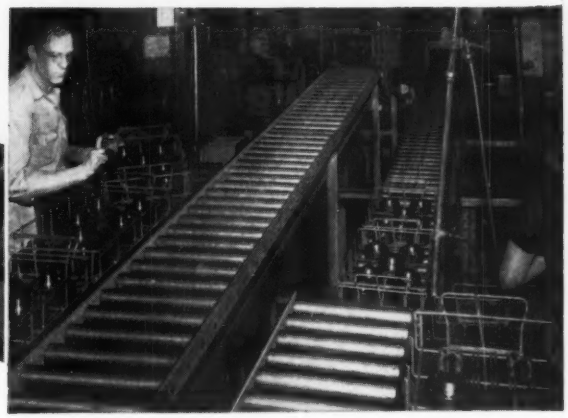
IT COSTS LESS

To Move Parts Between Operations

THIS WAY

This Olson Conveyor system saves thousands of man-hours yearly for a large automobile parts manufacturer. Roller conveyors, belt conveyors and chutes do all the "leg-work" moving automatic transmission planet carriers between operations. No truckers are needed . . . and there's no loss of machine operators' valuable time. The illustrations show why.





Castings from chuckers travel down Olson belt conveyors (rear), converge on roller conveyor for trip to broaching department.

Three roller conveyor lines keep battery of boring machines supplied with semi-finished castings. Extended conveyor ends serve as storage.

Line in foreground supplies grinder with basketed castings. From there, parts move along on the lower line to another department.

Parts in baskets move between various finishing operations on two roller lines while loose parts on right emerge from a grinding operation.

Why not talk to your Olson representative about the time and labor savings possible in your plant with and Olson conveyor system. For general plant ideas, request Catalog 1000-C.

OLSON CONVEYORS

SAMUEL OLSON MFG. CO., Inc.

DIVISION OF CHERRY-BURRELL CORPORATION
2426 Bloomingdale Avenue, Chicago 47, Illinois

Circle **88** on Reader Service Card

Destination Portland . . .

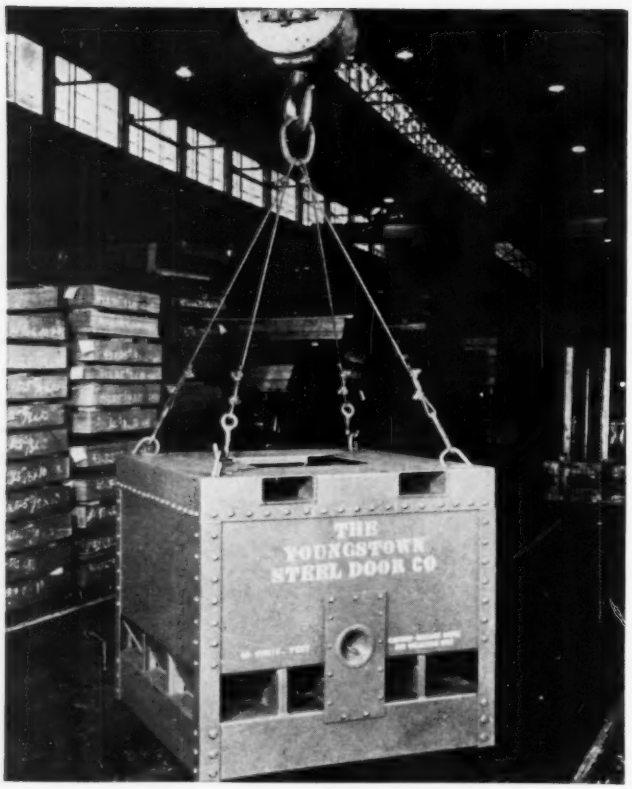
"It's the end of the day. But for these seven Clark trucks it's only the beginning . . . the beginning of a long life of service for five Portland companies.

"They go out of here like this day after day, load after load, to places all over the country . . . places like Oregon, Maine, Florida, California. When a man wants a lift truck that works harder, handles easier and lasts longer, he picks a Clark."

CLARK® EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek, Michigan

For full details,
see your local Clark Dealer
or circle 77 on reader service card



Youngstown Versatile Containers

Whether for transportation of your bulk products by rail, ship or truck or for use in handling bulk materials in your plant, there is a Youngstown top loading and bottom unloading container which will completely satisfy your individual requirements. Size of container is no obstacle. Youngstown top loading and bottom unloading containers range in size from 40 cubic feet to 325 cubic feet. Within this range there is a Youngstown container which will handle any bulk material effectively and economically. And it will do so with an appreciable reduction in labor costs and other operational savings.

Youngstown top loading and bottom unloading containers are built to withstand the most rigorous conditions. Their sturdy construction insures a long repair-free life. This construction also insures complete discharge of material and clean containers. These containers are easily handled by crane or lift truck. They can be stacked.

Discharge of material from the containers is controlled from the crane cab or lift truck seat. The time and labor savings flowing from such control is evident. Material discharge is simple and effortless. Closing and locking of the bottom discharge door is entirely automatic.

The discharge door is of sturdy, reinforced construction. When closed it is protected by the base of the container within which it lies. And this door is associated with the container base in such a manner that loss of material, however fine, is prevented.

The discharge door is automatically locked by Youngstown's patented lock which securely retains the door in closed position. The lock is completely housed and protected from the material in the container. When the container is supported upon its base the lock is relieved of all strain. The lock is tamper-proof.

The cost of Youngstown top loading and bottom unloading containers is soon returned by the savings which they produce.

• Consult with us for improved handling of your bulk materials

THE YOUNGSTOWN STEEL DOOR CO.

Camel Sales Company • Camel Company Limited

CLEVELAND • CHICAGO • NEW YORK • YOUNGSTOWN

Circle 118 on Reader Service Card

COST CUTTING IDEAS

used to package surgical sutures in glass tubes. In surgery, a nurse had to wrap the tube in a towel and break the glass to get at the suture. And then all she had was a twisted mass of thread.

The company designed a new package for its Curity Sutures. It keeps the suture constantly in a

reel. A doctor can use it without twisting it up in any way. The new soft pliable package is essentially two disks of polyethylene with a label inside. It easily breaks apart.

To reduce costs, and increase production, Bauer and Black had a machine developed to automatically assemble the containers and print the labels.

The machine feeds, diecuts, and positions the bottom of the package. Then it feeds, prints, and diecuts the labels. In the next position, it feeds, diecuts, and positions the tube. The package is then automatically brought together and heat sealed at the edges. Finally the machine counts and ejects the packages at a high rate.

Following reel assembly, the sutures are put in the reels in another process, sterilized, and then packaged in sterile containers.—*Designers For Industry, Inc.*

Circle **252** on Reader Service Card

Special Conveyor Does Three Jobs

Unusual protection from corrosion is built into a 2-stage washer at Hotpoint Division, General Electric Co., Chicago.

The monorail conveyor runs outside the washer, but its work hold-

Continued on next page

naturally... it's a job for **"WIREBOUND"**

Only a wirebound shipping container can provide the maximum protection for just about every kind of product. Superstrong Wirebound Boxes and Crates are rugged, versatile, economical, dependable . . . equal to every packing and shipping requirement. Your call will bring a Superstrong Wirebound engineer with all the facts.

SHIPPING SUPERSTRONG® CONTAINERS

WIREBOUND BOXES & CRATES

WIREBOUND BOX DIVISION

St.Regis PAPER COMPANY

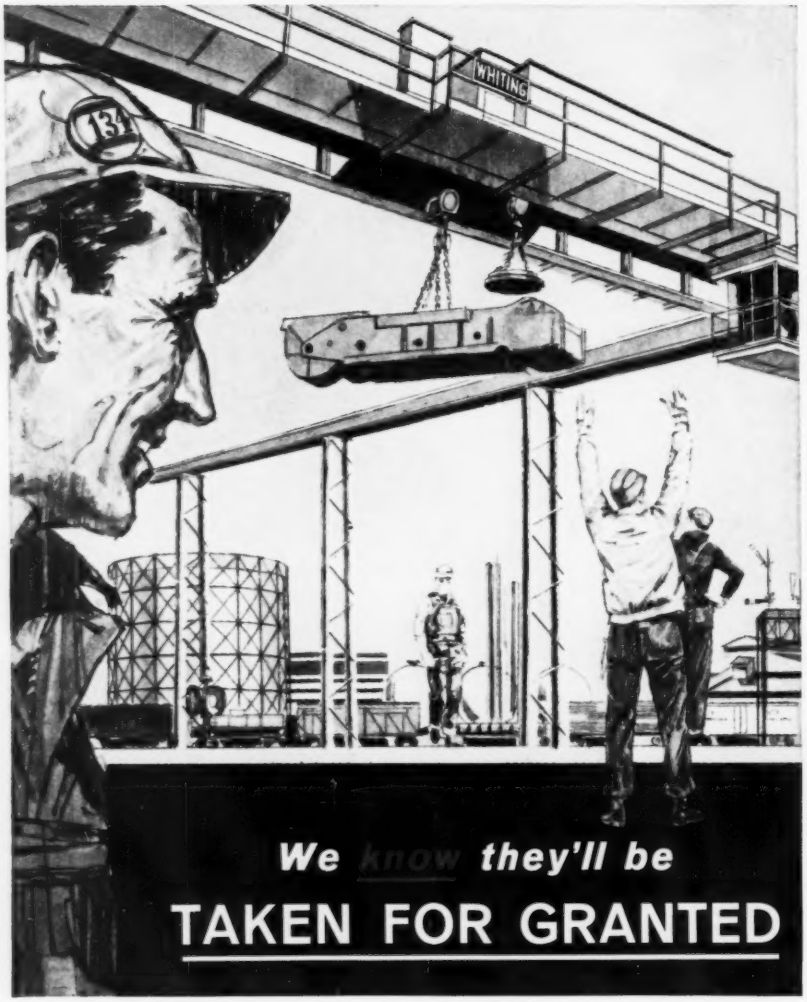
P.O. Box 4433 • Chicago 80, Illinois

Representatives in all Principal Industrial Areas

SUPERSTRONG WIREBOUND PALLET BOXES for economical, long-lasting, lightweight materials handling and storage.

GET THE FACTS
call
CAnal 6-0973
or write Dept.
300

Circle **97** on Reader Service Card



As anyone can tell you, people (especially wife-type people) dislike being taken for granted.

Yet in a busy manufacturing plant, production schedules depend on the taken-for-granted reliability of all equipment (but especially materials handling equipment).

Whiting materials handling systems are the result of years of engineering improvements and refinements. A crane, like the one above, is thoughtfully engineered and carefully constructed so that its unobtrusive dependability can be taken for granted day in and year out.

Let us tell you about Whiting Cranes. Write: Whiting Corporation, 15659 Lathrop Ave., Harvey, Ill. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada. Ask for bulletin: "How to Select An Overhead Traveling Crane."

See our catalog in Sweets

90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

CRANES WHITING

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL PROCESSING EQUIPMENT

Circle **113** on Reader Service Card

COST CUTTING IDEAS

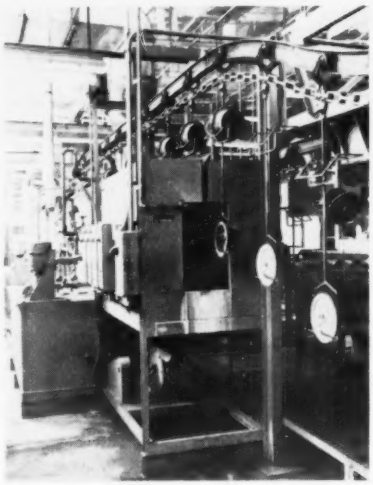
ers extend down through a slot in top of the washer. Unmachined parts ride in the top sections of the hangers, above and clear of the washer. Machined parts ride in the lower section hangers and pass through the washer.

In other words, one conveyor does these things:

- Works as a raw parts transport conveyor.
- Works as a machined parts transport conveyor.
- Works as a machined parts washer conveyor.

Hotpoint did not want the unmachined parts to pass through the washer. It would heat the parts and then their dimensions would change after machining and cooling. Further, washing them more than once was wasteful.

The 2-stage washer process 133 sets (2,800 lb.) of transmission



castings an hour at a conveyor speed of 10 feet a minute. Steam coils heat the solution tanks to 190° F. The liquid is sprayed through 105 nozzles at 16 pounds pressure. The solution pumps are vertical immersion type for easy removal. They deliver 350 gpm for washing, 150 gpm for rinsing.

High velocity air blows the water off. Neoprene seals at the top of the washer minimize steam loss.—*The DeVilbiss Co.*

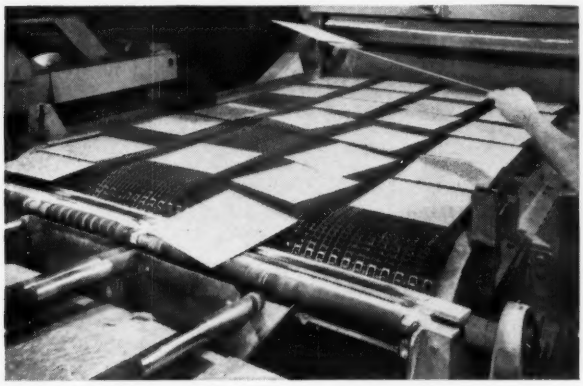
Circle **253** on Reader Service Card

Continued on page 24

Want more efficiency?

California Vegetable Concentrates, Inc., Modesto, Calif., got it with a belt-trough dryer using a USS Cyclone Conveyor Belt that dries their diced vegetables 84% faster than conventional tray dryers. The drying process* is more uniform, and eliminates loading and unloading of individual trays.

*Process designed by Dr. Ed Low, Western Regional Research Laboratory, United States Department of Agriculture. Dryer manufactured by Diamond Manufacturing Co., San Leandro, Calif.



Want to save time and money?

Johns-Manville Products Corp., Waukegan, Ill., used to have trouble aligning their floor tile for an accurate count. Now a Cyclone Conveyor Belt keeps the tiles squarely in line as it guides them to the counter. The time saved by the belt adds up to a sizable cut in costs.

Want uniform production every day?

Warner Dog Food Co., Inc., Brooklyn, N. Y., reduced downtime when they switched to a USS Cyclone Belt. Previous belt breakdowns meant costly delays because of the hours it took to cool and re-heat the bake ovens.

USS and Cyclone are registered trademarks

USS Cyclone Conveyor Belts will work wonders in your plant, too. Whatever your product, a Cyclone Belt will move it faster for less money. Cyclone makes more types of metal conveyor belts than anybody else in the industry. One of our sales engineers will be glad to drop around and tell you which of our basic belt types fit your needs. Send the coupon for your free booklet describing USS Cyclone Conveyor Belts in detail.

American Steel & Wire, Dept. 1134
614 Superior Ave., N.W.
Cleveland 13, Ohio

Please send me your free booklet on USS Cyclone Conveyor Belts.

Name _____

Address _____

City _____ Zone _____ State _____

Steel For strength, service, dependability.

American Steel & Wire
Division of
United States Steel

USS

Cyclone Sales Offices Coast to Coast

Circle **30** on Reader Service Card

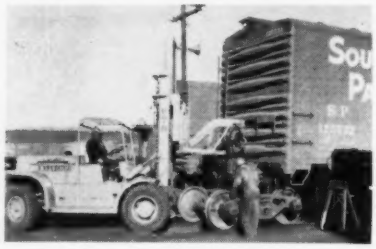
COST CUTTING IDEAS

System Reduces Costs And Increases Output

Southern Pacific Lines increased daily output of repaired freight car trucks and reduced its costs. The system: a centralized truck repair station and a specially-equipped lift truck at West Oakland, Calif.

The 15,000-lb.-capacity fork truck is equipped with a special boom attachment that quickly slides on or off 42-inch long forks. Without the attachment, the shop can use the truck in the ordinary way.

To remove a boxcar truck, the



men attach a wire rope sling to the boxcar coupler and then to the fork truck's boom. The truck hoists one end of the boxcar, and the men roll the worn trucks from beneath the car and put heavy metal stands in place to support the car.

Next, the lift truck delivers the worn truck to the repair shop, picks up a reconditioned set, and returns it to the boxcar. The repaired truck is lowered to the track and rolled beneath the boxcar while the fork truck raises the car.

Other duties of the truck: it carries scrap decking and lining; hangs boxcar doors, removes and replaces couplers; adjusts loads on the cars; moves various yard equipment.—*Clark Equipment Co.*

Circle **254** on Reader Service Card

Package Reduces Shipping Costs

They use light, palletized corrugated cartons to ship electronic equipment weighing 600 lb. and over at Sola Electric Co., Elk Grove, Ill.

The change from wooden crates was so revolutionary that Sola said customers at first tested goods on arrival to be sure they were trouble free. They were.

The sturdy corrugated cartons have expendable wooden pallets as a base. The corrugated is made of a high humidity board. The transformer goes into the carton, and together they're bolted to the pallet. Reinforcing sleeves in the carton provide stacking strength. The top of the carton is steel-strapped to the pallet.

Sola says that this palletizing method makes the cartons easy to

store and ship, and easy for the customer to handle. Even though the cartons are light, they can withstand up to 2,000 lb. and they

Continued on page 28

BOILER PLATE HANDLING PROBLEM

...solved for Grand Rapids Boiler Works by

"It does the job quick and easy" says plant foreman Charles Storms. Pictured is MagnaLift holding a 6' x 12' sheet of 1½" plate suspended for marking of cut-outs by Al Walters, at the hoist controls.

You can use MagnaLift anywhere—as a battery-powered unit or powered from an A.C. line. You can put the power pack on the magnet or place it elsewhere for remote control by extension cable. However you use it, you'll find MagnaLift one of the most useful lifting tools you've ever had! Send for all the details today.

MagnaLift
battery-powered
LIFT MAGNET

capacities
1-TON
and
2-TON

3 Interchangeable Power Packs

12-Volt Battery . . . 12-Volt Battery with Variable Holding Power . . . 110-Volt A.C. with Built-in D.C. Rectifier.

Model LM4 (2 ton), $3850⁰
F.O.B. Big Rapids, Mich.

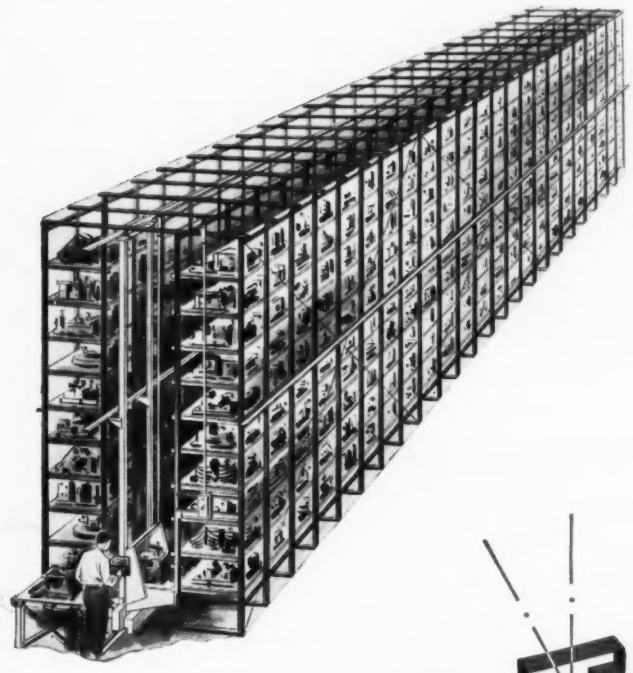
Dealer inquiries invited

Hanchett MAGNA-LOCK CORPORATION BIG RAPIDS, MICHIGAN, U.S.A.

Circle **60** on Reader Service Card

5000 tools and dies available at fingertip control

Without moving from the end of the aisle, an operator directs the movements of the TRIAX® **Retriever**® on this new two-way control console. He sets the controls to deliver one load to a vacant opening and to bring another load back at the same time.



In this sample TRIAX® **Retriever**® material handling installation, an estimated 5000 tools or fixtures could be stored at random, with immediate access to any one of them.

The standard line of 19 sizes of pre-engineered standard **Retrievers** offers great adaptability to a number of material handling and storage problems.

A **Retriever** can save large amounts of valuable floor space, utilize all air space from floor to ceiling, and often effect considerable saving in labor costs.

Retrievers are now in service in varied capacities . . . work-in-process storage, tool and fixture storage, a distribution center for finished products and finished parts storage.

We would welcome the opportunity to discuss possible **Retriever** applications in your present or future plant or warehouse.

THE TRIAX COMPANY

SWeetbriar 1-9800

11955 SHAKER BLVD. • CLEVELAND 20, OHIO

Circle **109** on Reader Service Card

ELPAR® ...engineered to

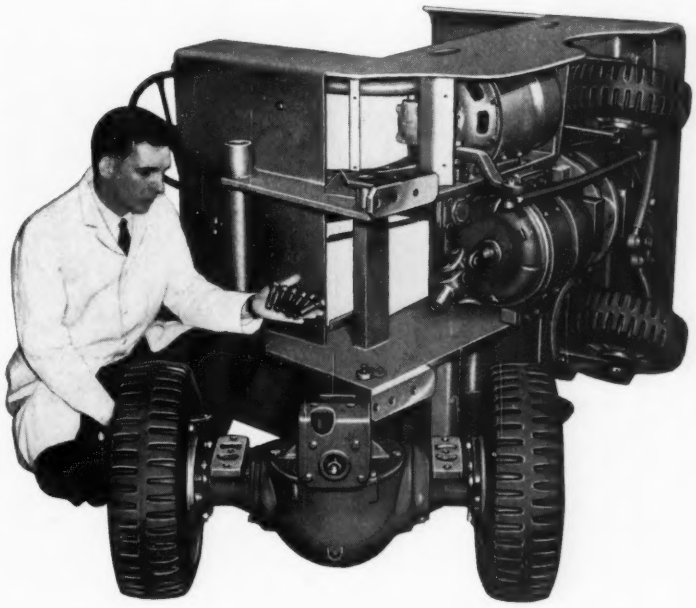
SAVE on operating costs

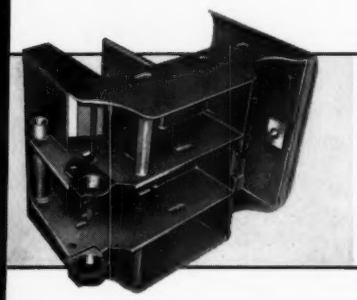
You can't afford to own an industrial truck that breaks down frequently—or one that wears out quickly. A truck out of service can cost you $100 or more per day.

You pay the same price for an ELPAR as you pay for production-line models...but you get the handling efficiency you expect plus the operating economy you deserve!

Match this advanced design with the trucks you've accepted up to now...

Centersill frame construction—used on all ELPAR fork trucks, provides accessibility...gives the maintenance man a break. Access holes are where they should be. Forward battery compartment bulkhead and operator compartment floorboards are removable. All major sub-assemblies—drive axle, trail axle, uprights, tilt cylinders—are independently mounted directly on the sills to simplify removal for major repairs...cuts downtime.





Typical ELPAR frame is designed around heavy center sills which run the length of the truck. These are held rigid by ample cross-bracing. Skirts surrounding the truck add strength and protect the undercarriage.

For more information on ELPAR trucks, write for this booklet—"Special Engineering Service". Or, call your local ELPAR man.

ELPAR®
ELECTRIC TRUCKS

The Elwell-Parker Electric Company
4231 ST. CLAIR AVENUE • CLEVELAND 3, OHIO
In Canada: International Equipment Company, Ltd.

TWICE THE LIFE...ONE THIRD THE OPERATING COST

Circle 44 on Reader Service Card

4 NEW

Nutting floor trucks

For More Production — Less Effort — Greater Safety

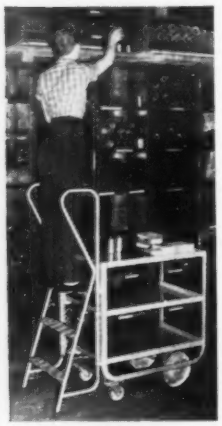


Fig. 912-334

Safe High-Reach Order Picking

Operator's weight depresses spring loaded ladder for braking. Safety tread steps. Forward and side support with cross bar and extended handles.

Easy Packing and Strapping

Grid top for easy passing of strapping beneath cartons. Foot operated stabilizer prevents rolling. Rocker type frame for safe load discharge. Available less wheels.

Fig. 517A

Bigger pay loads with less effort

Especially built for strength without weight, this truck is made of aluminum alloy — structural type to handle heavy loads. Lightweight design means manpower is able to handle more frequent, larger loads.

Fig. 2452 E-AL

Dollar Saving Jack and Skid System

Nutting Hook-'N-Go jacks and skids for mobile storage are low in initial cost . . . eliminate expensive flooring and re-handling . . . provide instant mobility of stored materials. One jack services many skids.

Fig. 2418 Jack

Fig. 422 Skid

These 4 new standard models will boost production with less effort, greater safety . . . based on lighter weight and design for special need. They are examples of many other Nutting standard models for special applications. The Nutting line is complete . . . *over 1,000 standard styles* — thereby, more often than not, saving you the high cost of made-to-order models.

Want more information? Please write — use reader service card or coupon below.

NUTTING TRUCK AND CASTER COMPANY

104 West Division St. — Faribault, Minnesota

Please send literature on:

☐ Fig. 517A ☐ Fig. 912-334 ☐ Fig. 2452E-AL

☐ Fig. 422 and 2418 ☐ Casters

Other for handling_____

☐ Send Catalog 59G, illustrating variety of trucks and casters

NAME AND TITLE_____

COMPANY NAME_____

ADDRESS_____

CITY_____ STATE_____

Circle **86** on Reader Service Card

COST CUTTING IDEAS

can safely be stacked three high. The lower weight reduces shipping costs. Finally, the Sola customer can utilize the pallets for internal material handling if desired.

Sola says that the man hours once spent in making wooden crates have given way to minutes necessary to staple the corrugated cartons into shape.—*Sola Electric Co.*

Circle **255** on Reader Service Card

Green Belt Surface Eases Graders' Jobs

Green-colored rubber conveyor belts speed food processing at the Stayton Canning Co., Stayton, Oregon.

Stayton says the belts have cut labor, maintenance, and replacement costs. The company processes 75 million pounds of food a year.

It installed its first green belts in 1959, after quality control tests showed that special compounds used in their manufacture retarded the growth of bacteria and mold.

According to Vic Schaefer, assistant superintendent, "The green belts do not absorb moisture as do fabric belts." No stretching or shrinkage adjustments have been necessary since we put these belts on our wet corn lines. And they handle 11 million pounds of corn on the cob a season.

"With only 1,000 feet of the belt in operation, we are saving 24 man-hours a week in cleaning time. We hose the green belts down three times a day, scrub them at the end

Continued on page 30

Set the dial and let 'em roll!

FROM RECEIVING TO PRODUCTION TO SHIPPING . . . VIA *TOWMATIC!!

AUTOMATIC SWITCHING TOWVEYORS? We custom-make them to fit your exact specifications . . . from small detachable selector units offering up to six dispatching points, to large elaborate units offering up to 100 different dispatching points! We call it TOWMATIC. Since its inception, several years ago, Webb has installed *more* automatic switching towveyors *than any other manufacturer.*

TOWMATIC, the latest innovation in Towveyors, allows the cart to travel from any station to any other predetermined station on the power loop. The carts can be placed or removed from the power loop at any point by raising or lowering the tow-pin. *It is never necessary to wait for power!* The carts can be engaged at any position on the loop and are immediately on their way! Results? Materials are automatically moved from one area of the plant or warehouse to any other area . . . with no personal escort!

Towveyor installations are custom-made to suit the specific layout for which it is intended. So, whether you are operating out of a two-car garage, or a million square foot establishment, it will pay you to investigate the possibilities of Towmatic. Call a Webb Engineer today . . . he'll show you how to increase your profits through efficient materials handling methods.

Registered Trade Name

SPECIALISTS IN CUSTOM CONVEYOR SYSTEMS

JERVIS B. WEBB COMPANY

8951 ALPINE AVENUE • DETROIT 4, MICHIGAN

OFFICES IN ALL PRINCIPAL CITIES

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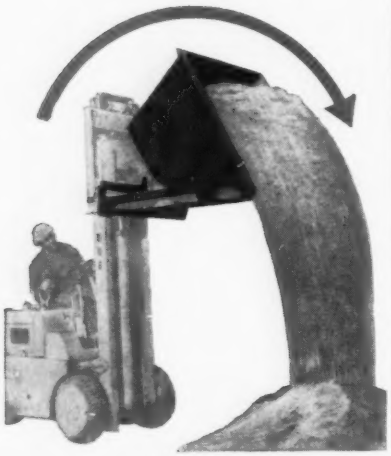
FITS ANY LIFT TRUCK DUMPS AUTOMATICALLY



CAN CUT HANDLING COSTS 50%

With this self-dumping hopper on your lift truck, one man can do the work of two—in a fraction of the usual time. It's the modern, low-cost way to handle scrap metal, small castings, cinders, punch press parts, hot forgings, cullet—all kinds of bulk material.

DUMPS ITSELF

RIGHTS ITSELF

LOCKS ITSELF

Attaches in seconds to any lift truck—fork or platform. Can't slip off. Operator picks up loaded Hopper—transports it to its destination—releases the latch—and the Hopper automatically dumps its load, rights itself, locks itself.

Roura Hoppers are sturdily made of 3/16" steel plate with continuous arc-welded seams. Heavier plate if desired, also stainless steel or galvanized. Made in eight sizes, 1/3 to 4 yard capacities, mounted on live skids or a choice of wheels. Standard models available for immediate shipment.

ROURA
Self-Dumping
HOPPER

WANT MORE DETAILS? Just clip this coupon to your letterhead and mail to
ROURA IRON WORKS, INC.
1411 Woodland Ave., Detroit 11, Michigan

Circle **95** on Reader Service Card

COST CUTTING IDEAS

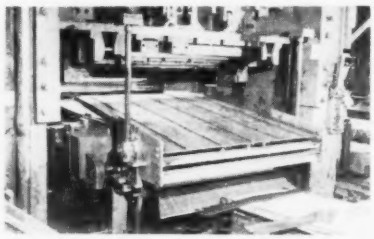
of the season. We had to scrub fabric belts on the corn lines every week. The job took six men four hours."

Schaefer said corn graders find their jobs easier and faster, too. They classify the corn by color, and the yellows and golds are more pronounced against the green background.—*B.F. Goodrich Co.*

Circle **256** on Reader Service Card

Part-Unloader Increases Production

Removing blanks with a part-unloader increases production of stampings on a 400-ton press at the Chrysler Mack Avenue Stamping Plant. Sources of the increase: efficient handling of the blanks,



maintenance-free operation of the unloader.

The unloader handles four blanking dies of various widths in brief change-over time. Blanks go to a moving conveyor, discharge into the storage bin. A chute under and through the unloader receives scrap. A conveyor carries it to the scrap bin.

A press ram supplies power for the unloader. It drives twin vertical racks which move the tray in and out of the die area. This positive linkage with the action of the press insures trouble-free operation.

The unloader shown has a tray width of 62" and a tray stroke of 40".—*Lahr Machine & Tool Corp.*

Circle **257** on Reader Service Card

Vertical Lift Cuts Costs

Production just plain outgrew the once-adequate handling method at J. H. Allison & Co., a pack-

Continued on page 32

(Advertisement)

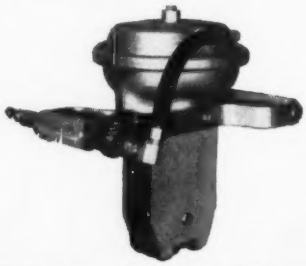
NEW PRODUCTS

PNEUMATIC STRETCHER

Model 651 — Featuring adjustable controlled tension. Tool takes various size strapping . . . operates well on small surface. Write: A. J. Gerrard, 402 East Touhy Avenue, Des Plaines, Illinois.

Circle **22** on Reader Service Card

PNEUMATIC SEALER



Models 660 — 3/4" **661** — 1 1/4" — New effortless double crimp pneumatic sealer provides faster, positive sealing action. Write: A. J. Gerrard, 402 East Touhy Avenue, Des Plaines, Illinois.

Circle **23** on Reader Service Card

STRAP CUTTER

Model 550 — Cuts strap to 2" x .050 with less effort. Legs on lower handle provide extra stability. Long handles give greater operator safety. Write: A. J. Gerrard, 402 East Touhy Avenue, Des Plaines, Illinois.

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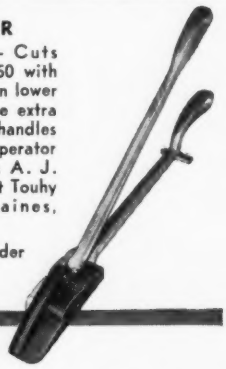
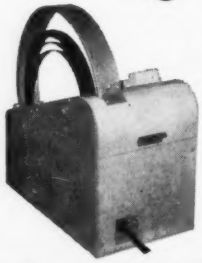
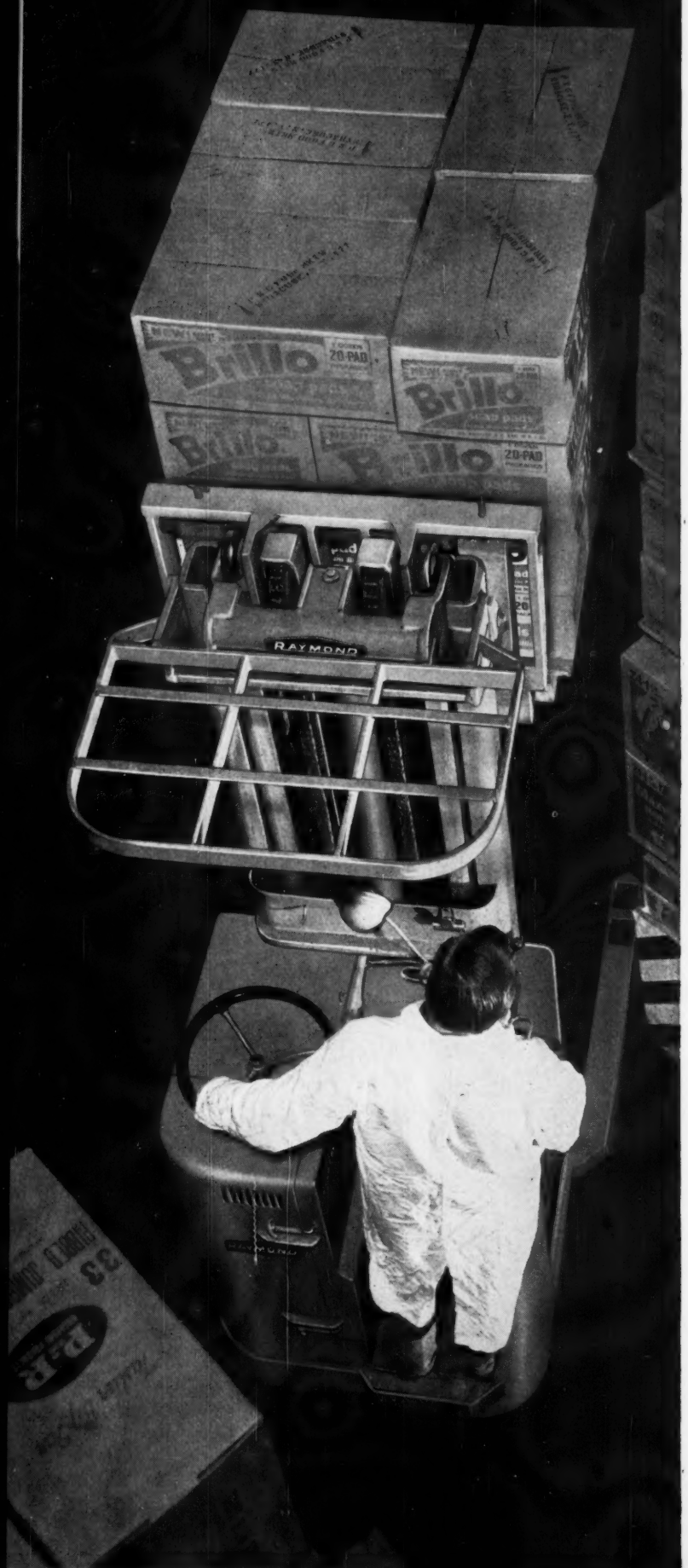




DIAL-A-BAND DISPENSER

Model 440 — Set the dial and press a button — new dispenser automatically feeds and cuts exact length and number of straps needed. Write A. J. Gerrard, 402 East Touhy Avenue, Des Plaines, Illinois.

Circle **25** on Reader Service Card



how to store one-third more

Put an end to waste in warehouse space with a RAYMOND Narrow Aisle Truck. This compact truck lets you store from ⅓ to ½ more by tiering in aisles as narrow as 6 ft. Saves you 4 to 6 feet per aisle over the space counterweighted trucks require . . . yet it actually stacks loads in racks 20 ft. above the floor. At current warehouse construction and rental costs, the dollar savings could prove substantial to you. Our latest catalog supplies full details on this superbly-built RAYMOND Truck. Why not write for a copy?

RAYMOND®

Originator and World's Largest
Builder of Narrow Aisle Trucks

The RAYMOND CORPORATION
3350 Madison St., Greene, N.Y.
Please send latest RAYMOND Narrow Aisle Handling Equipment catalog.

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COMPANY _____

STREET _____

CITY _____ STATE _____

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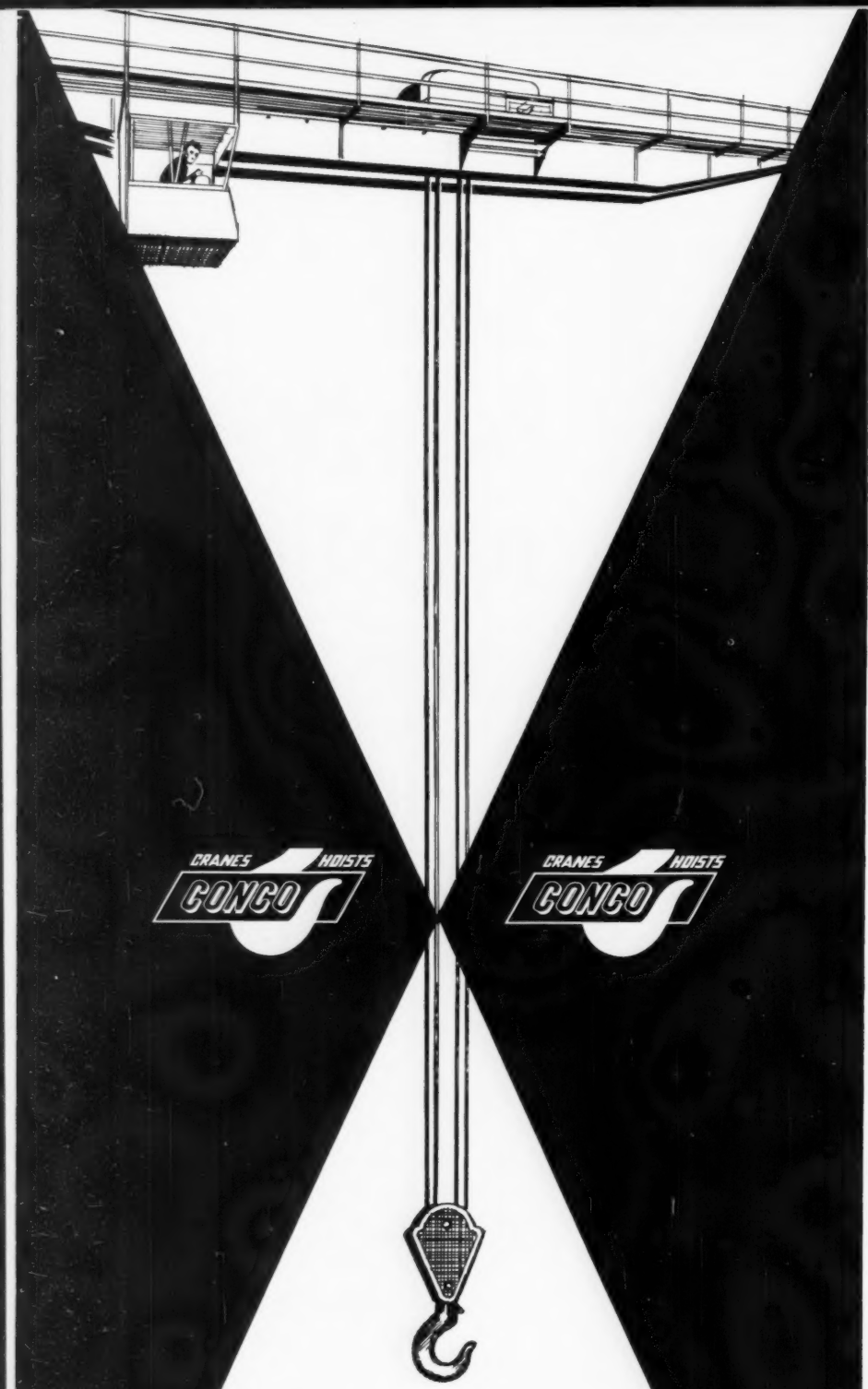


Custom-Engineered
Overhead Electric Traveling
Cranes in Capacities to
150 Tons. Write for Bulletin 5000B.

Material Handling Division
CONCO ENGINEERING WORKS, INC.
Mendota, Illinois

AFFILIATES: Spartan Tool Division—Powered Sewer Cleaning Equipment • Field Control Division—Barometric Draft Controls • Conco Building Products, Inc.—Brick, Tile, Stone

Circle **27** on Reader Service Card

COST CUTTING IDEAS

ing plant in Chattanooga, Tenn. The trouble showed to worst advantage in the manpower, time, and space wasted in getting goods from production on the ground floor to shipping on the first floor.

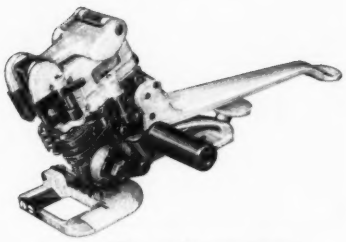
Under the old system, men loaded cartons of bacon, ham, and sausage onto flat, 4-wheeled handcarts. They pushed them across

the floor and took them upstairs on a freight elevator. On the 2nd floor, they unloaded their carts, stacked their boxes in the shipping department. Later crews loaded the trucks. Accumulation was awkward, and it required additional manual handling. Cartons spilled, and every day it took two man hours of overtime to move the last of the packed cartons upstairs.

They needed, as anyone could see, something special in lifting apparatus. The decision went to a highspeed continuous lift. It self-loads, lifts straight up, and self-unloads. It can lift or lower as many as 10 loads a minute.

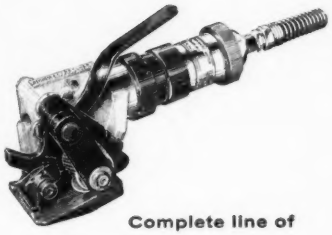
The lift keeps the cartons flowing quickly and smoothly up to the shipping department. They handle six cartons every minute. No operator is needed. The company estimates the lift will pay for itself in one year. Moreover, production moves rapidly and efficiently.—*Standard Conveyor Co.*

Circle **258** on Reader Service Card



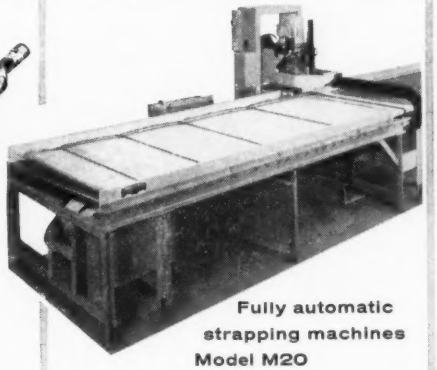
The only one-hand strapping tools
SFC Series

Power strap feeders
Model PSF

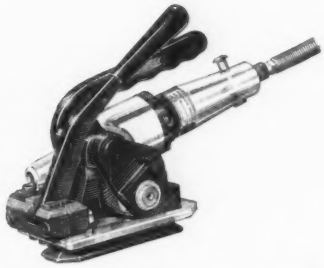


Complete line of air power tensioners
PN Series

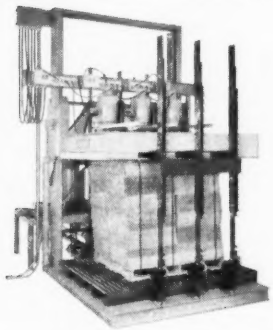
Air and electric power portable strapping machines
AP and AE Series



Fully automatic strapping machines
Model M20

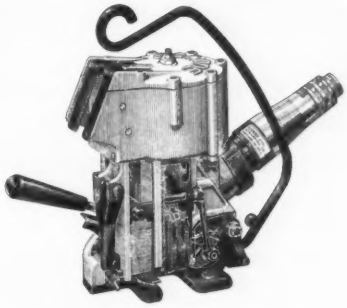


The first air power feed wheel tensioner for heavy duty strapping
FN Series



First completely automatic compression strapping machines
CSM Series

Heavy-duty ¾-inch pistol grip air power sealers
Model RCNS



Air power tensions, seals, and severs the strapping
AMP Series

Make your product cost less to handle, store, ship and receive

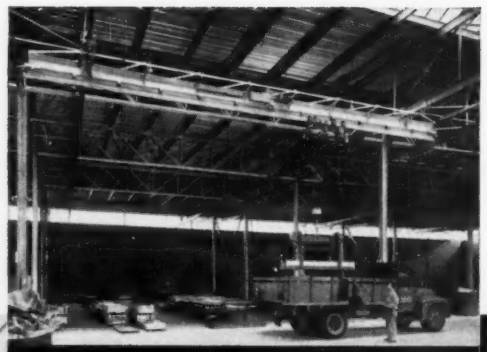
Binding things together with steel strapping is a low cost way to eliminate individual handlings, save space, and prevent damage. These nine machines—part of the most complete line of equipment in the steel strapping industry—create new ways to make your product cost less to handle, store, ship and receive. For additional information on any or all of these tools, write:

First in steel strapping

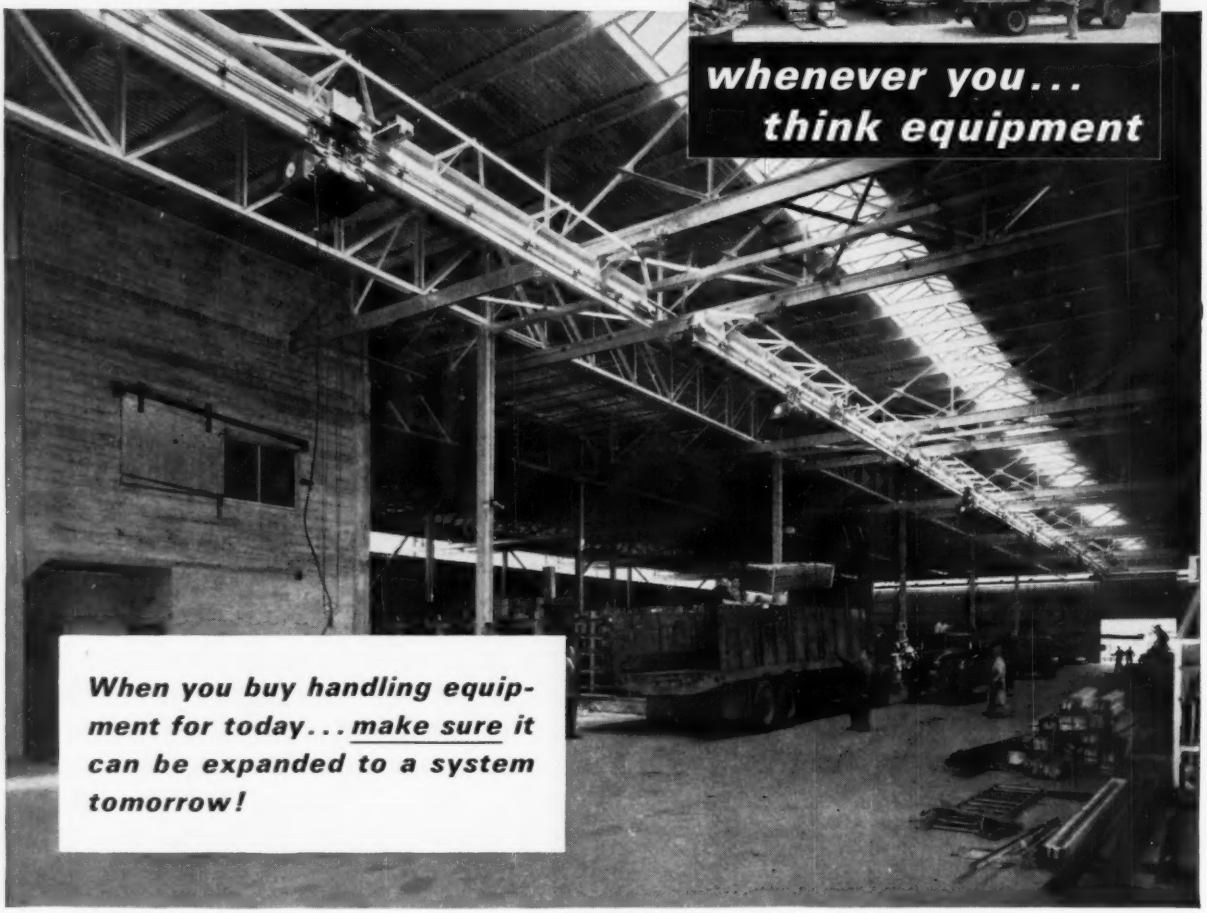
SIGNODE
STEEL STRAPPING CO.
2618 North Western Avenue • Chicago 47, Illinois
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Circle **99** on Reader Service Card

Get the BIG PICTURE



whenever you... think equipment



When you buy handling equipment for today... make sure it can be expanded to a system tomorrow!

This is the advice of a leading materials handling publication . . . and this is the way American Monorail engineers advise you.

The American Monorail cranes shown above can be installed a bay at a time — as your plant grows. You can interlock them to give an efficient integrated system.

This type of "look ahead" planning is what you get from our engineers when you decide on a traveling Monorail track system, too.

Just tell us what you need today and tell us about your dreams of the future. In that way we can help you plan the big picture at lower cost. Write for Bulletin C-2.

AMERICAN MONORAIL

ENGINEERED MATERIALS HANDLING

1129 EAST 200th STREET CLEVELAND 17, OHIO

DIVISIONS: Conveyor Division, Tipp City, Ohio — Canadian Monorail Co., Ltd., Brampton, Ont

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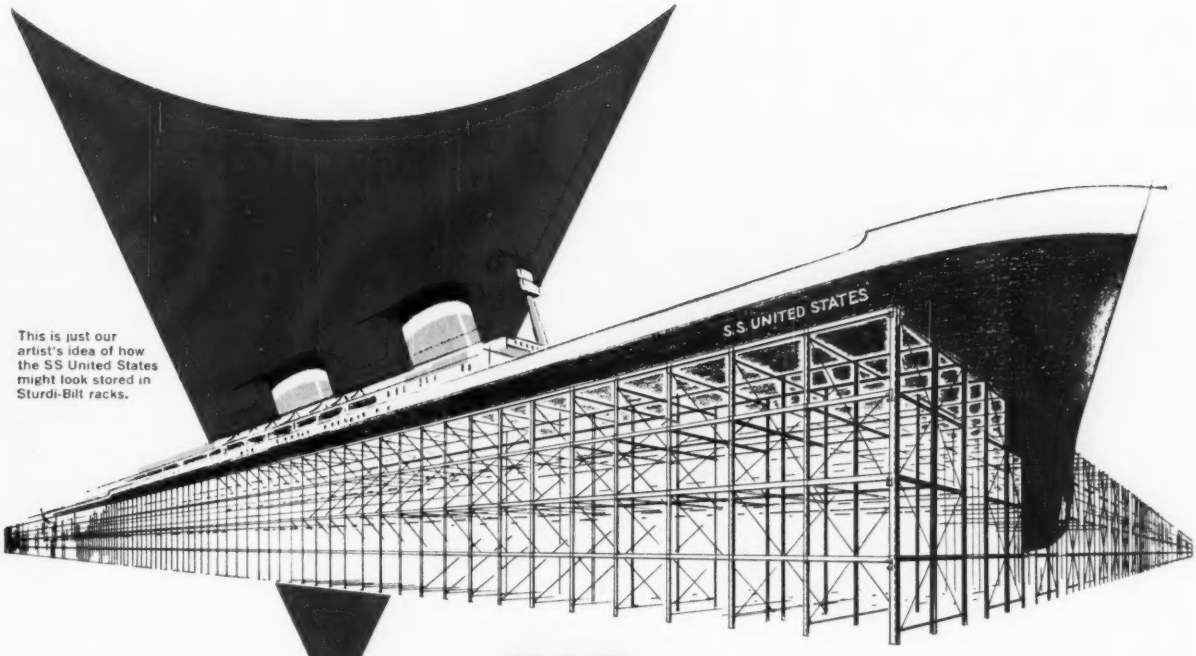


This is just our artist's idea of how the SS United States might look stored in Sturdi-Bilt racks.

no matter how **BIG** your storage problem is

STURDI BILT HAS THE ANSWER

The most advanced builder of racks in the world can engineer the answer to your storage problems, no matter how small or large. Whether you have outgrown your present facilities or have a brand-new set of worries, STURDI-BILT specialists are ready to help you work out a custom plan, tailored to fit your own individual needs, with maximum economy and complete dependability.

And, here's important news, too. You can now buy all your rack needs on the new exclusive STURDI-BILT TIME-PAY PLAN. Take up to 5 YEARS to pay without tying up your own working capital. You buy better when you buy STURDI-BILT because only STURDI-BILT racks have all these advantages.

- **unmatched safety and stability**
- **fast, easy assembly**
- **complete adjustability**
- **add-a-section versatility**
- **patented FLOAT-WEDGE construction**

Let this symbol be your guide

STURDI BILT
Racks the goods of the world

BUY BETTER—BUY STURDI-BILT

STURDI-BILT Material Handling Division
Union Asbestos and Rubber Company
332 South Michigan Avenue, Dept. MHE-51
Chicago 4, Illinois

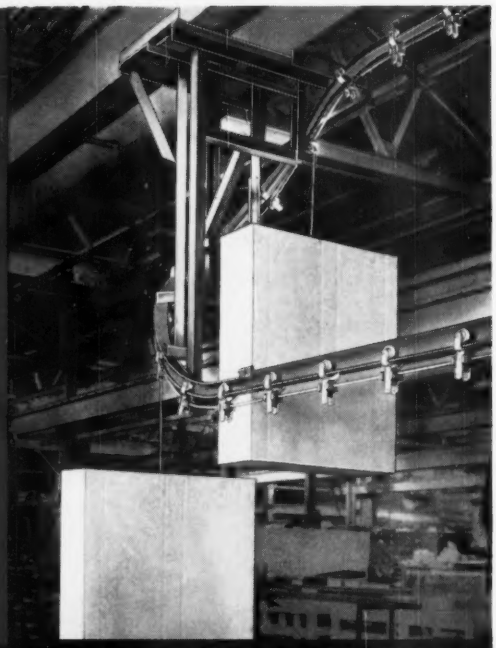
☐ Please send me helpful new booklet, STORAGE PLANNING GUIDE
☐ Please send me data on the TIME-PAY plan

NAME.....TITLE.....
COMPANY.....
ADDRESS.....
CITY.....ZONE.....STATE.....

Circle **102** on Reader Service Card

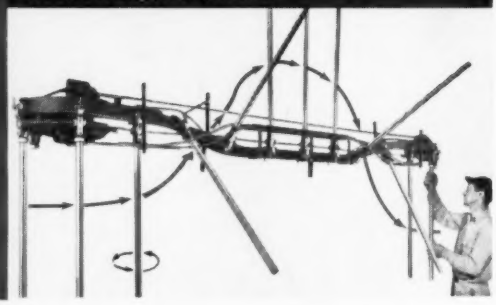
2 BASIC PATENT FEATURES

. . . . . with unlimited applications



Bush-Lock permits spiraled end turn for large parts clearance on close centered parallel tracks.

Bush-Lock's floating action permits trolleys to follow a special path while the cable travels in a straight line. No other conveyor can do this.



The low-cost efficiency that industry finds in long-lived Bush-Lock cable conveyors is obtainable in no other overhead system. For only Buschman patents cover these essentials: 1) straight-through continuous power cable—100-ft. lengths without a joint or link; 2) radially-free trolley alignment with track.

1. STRONG *PULLING* ELEMENT is the straight-through continuous cable . . . in 100-ft. lengths, with half buttons for quick coupling. Cylindrical buttons are swaged on cable, float free within trolley cavities, relieve any spiral twist and ensure true alignment with track. Only in Bush-Lock can the cable pull straight, even when path of trolleys and load is diverted. No restraining screws and clamps, no built-in strains, no links and wear points.

2. ROTARY *FLOATING* TROLLEY ACTION . . . Mating half section blocks bolt easily around swaged buttons to form cylindrical *cavity* in which the button rides free. This prevents cable strain of the clamped design. Trolleys align themselves without restraint. *The cable has factory built-in lubrication.* Bush-Lock cavity is pressure lubricated.

Bush-Lock features can be engineered to your needs, as they are in thousands of other plants. Get further details and see how they can serve *you.* Write for Engineering Data No. 52A, to The E. W. Buschman Company, 4450 Clifton Ave., Cincinnati 32, Ohio.

. . .

Buschman
CONVEYORS

Complete Conveyor Systems for all Types of Industries:
Engineered, Manufactured, Installed.
Representatives in Principal Cities; See Yellow Pages. 370

Circle **13** on Reader Service Card

mhe PRODUCT NEWS

Economical Pallet Truck

Powerworker 30P for light duty pallet handling. Twelve-volt battery, two speeds forward and back. Fin-

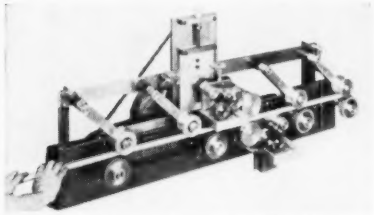
ger-tip control of all functions. Pallet fork lengths range from 30 to 54 inches in 6-inch steps. Turns in 64½-inch radius with 48-inch fork.

Clark Equipment Co.

Circle **301** on Reader Service Card

Tube, Rod Marker

Machine makes neat, clear imprints on long, round objects. Won't smudge or blur. Prints color codes,



cut-off marks, other identification on top and bottom of rigid or semi-rigid plastic or metal tubes and rods. Handles 3/8- to 3-inch stock, may be altered for other sizes.

Industrial Marking Equipment Co., Inc.

Circle **302** on Reader Service Card

Automatic Power Shovel

For unloading bulk materials from railway cars, or long truck trailers. The Webster No. 40 handles grain, feed, coal, lime, cement, etc. Can be used with wood, aluminum, or steel scoops. Shovel mechanism comes in single and double types, easily mounts on a rigid support 10 to 12 ft. above the car door level. Shovel is designed for 35 ft. maximum travel. Features include a reversing system which eliminates the need for counterweights.

Webster Mfg., Inc.

Circle **303** on Reader Service Card

Power Dumper Speeds Food Making

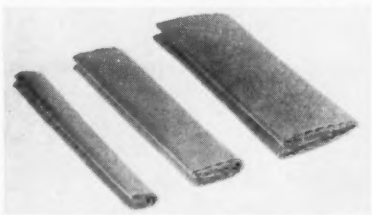
PowRdumper lifts 10,000-lb. boxes, dumps contents at 45° angle to table, chute, conveyor. Saves time, labor; improves safety. Clamps hold round or square containers securely during

dump. Storing food in boxes may increase storage space by 30 percent and improve aeration.

Langley Mfg. Company

Circle **304** on Reader Service Card

Protects Stamped Edges



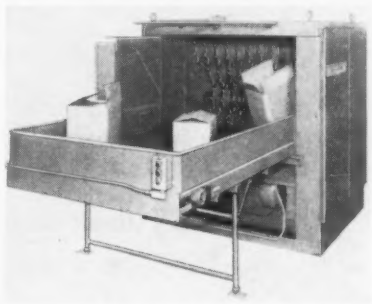
Edg-Pak slips over and grips edges, flanges, turned-up lips of metal stampings and extrusions, cushions and protects them. Prevents injuries to personnel. Made in 4 paper wraps, 3 widths. Cut lengths or rolls.

Flex-O-Lators, Inc.

Circle **305** on Reader Service Card

Cardboard Box Shredder

Slow-speed ripper wheels reduce partitioned boxes to shreds, 6,000

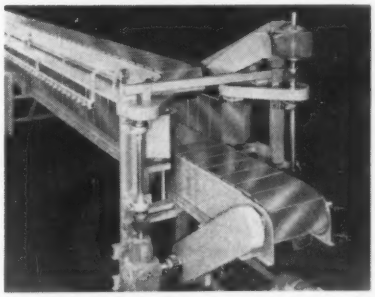


lb. per hour, without pre-flattening. Little noise or dust, ripper teeth tear, don't beat. Bits of metal, wood, glass won't harm them. Shreds removed mechanically or pneumatically. No special floor mount or foundation. Model 5C-2548.

Blower Application Company

Circle **306** on Reader Service Card

4-Sided Conveyor All Sides Move



Tunnel-like conveyor combines 4 synchronized metal belts as takeoff unit for an extruder or other continuous forming operation. Height adjusts. Spring-mounted top belt com-

Continued on page 39

For High Stacking from Narrow Aisles

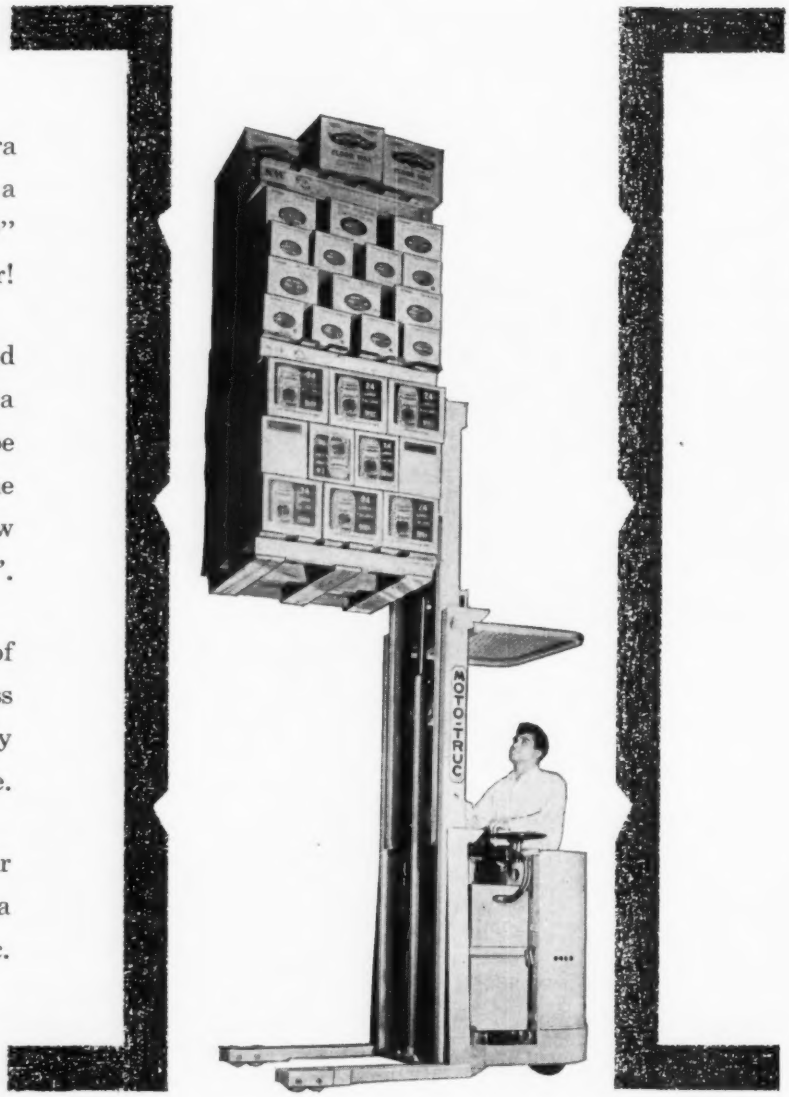
...use MOTO-TRUC

Get a real bonus in extra floor space with a Moto-Truc "small rider" type high stacker!

They combine the speed and convenience of a conventional rider type truck with the maneuverability and low price of a "walkie".

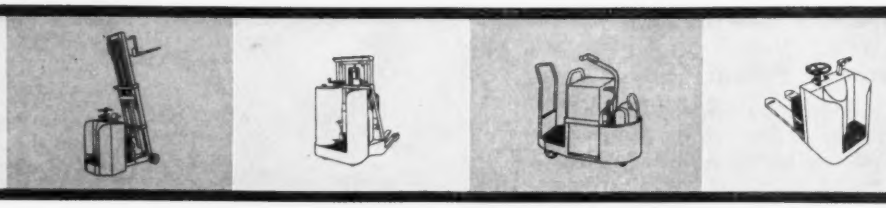
The clean simple design of Moto-Trucs mean less maintenance, fewer costly repairs and long service life.

Make the most of your storage space with a high stacking Moto-Truc.



The MOTO-TRUC Company
12403 TAFT AVENUE • CLEVELAND, OHIO

World's Largest Manufacturer of Small Rider Trucks



Circle **81** on Reader Service Card

PRODUCT NEWS

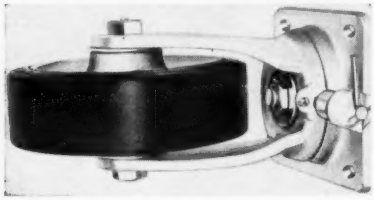
pensates for product variations, controls working pressure. All belts run on ball bearings, have tight joints, are self-tracking. Stainless steel. Variable speed drives with or without remote control and speed indication. Light enough to be portable.

M-H Standard Corp.

Circle **307** on Reader Service Card

Improved Caster Lock

Swivel locking lever operates over specially formed Nylon cap effortlessly, and with secure positioning. Available on nearly all of maker's line of swivel casters. Uses spring-loaded pin as locking device.



Albion Industries, Inc.

Circle **308** on Reader Service Card

Climb With Ease

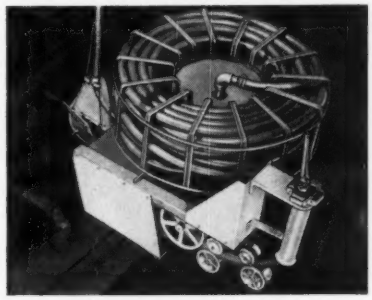
Custom-made, moderately priced metal ladder for access to platforms, balconies. Safe. Five styles meet heights to 15 ft. Verticals for limited areas, sloping ones for more room. Cast, flat treads 3″ wide, non-skid surface. Widths, 19″ or 26″. Flanges at ends weld or bolt to floor and platform. There's a model that fastens to platform only—no support needed on floor.

Perma, Inc.

Circle **309** on Reader Service Card

Powered Reel for Heavy Hose

Mounts on wall or ceiling, keeps hose out of the way. Pushbutton control, 1/3 hp motor. Zierco reel level-coils hose by gravity, stops kinks, tight coiling, and strains. Six aluminum rollers payout and takeup 100 ft. per minute. Reel capacities from 50 to 500 ft. depending on hose size.

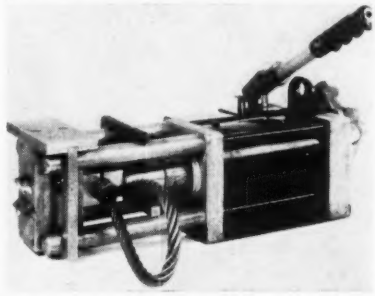


Zierden Company

Circle **310** on Reader Service Card

Portable Cable Splicer

Lightweight, portable hydraulic unit cuts and repairs cables on the job. No need to dismantle long cables for transport to shop. Develops 15 tons pressure, handles cable to ½-inch. Makes slings, eyes, chokers, splices. Cuts without fraying, leaves smooth edge. No kinking or flattening.

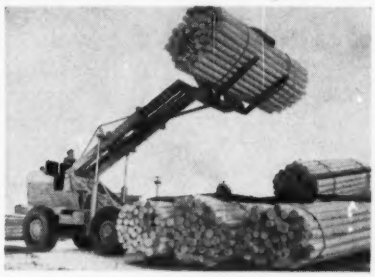


Mark Naught, Inc.

Circle **311** on Reader Service Card

Multi-Purpose Loader

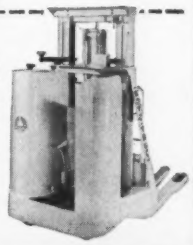
Lift arms on Dynalugger have variable forward reach of up to 11 ft.—4 in. Powered clamp holds awkward loads steady. Payload—10,000 lb.



Continued on next page

Counterbalanced fork truck handles variety of pallets or skids, requires no outriggers. Available with or without telescoping mast in capacities up to 3000 lbs., lifts up to 130″.

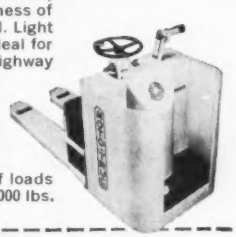
Outrigger type Hi-Lift fork truck for extra stability. Four-wheel support, Magic Circle steering, available in three models for any handling application. Capacities up to 4000 lbs., lifts up to 152″.

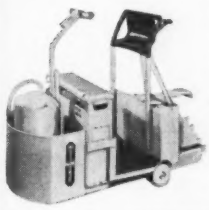


MOTO-TRUC

Small Rider Trucks

Pallet truck has compactness of a walkie, ruggedness of a rider model. Light weight is ideal for loading highway trucks. Wheel steering, foot brake, dead man control. For horizontal movement of loads up to 4000 lbs.





Tractors feature unique design permitting operation from walking or riding position. Small, maneuverable, all safety features. Develop up to 750 lbs. draw bar pull.

Write for Moto-Truc's free Ride-A-Man catalog — Bulletin No. 56-R.

World's Largest Manufacturer of Small-Rider Trucks

The MOTO-TRUC Company

12403 Taft Avenue • Cleveland, Ohio

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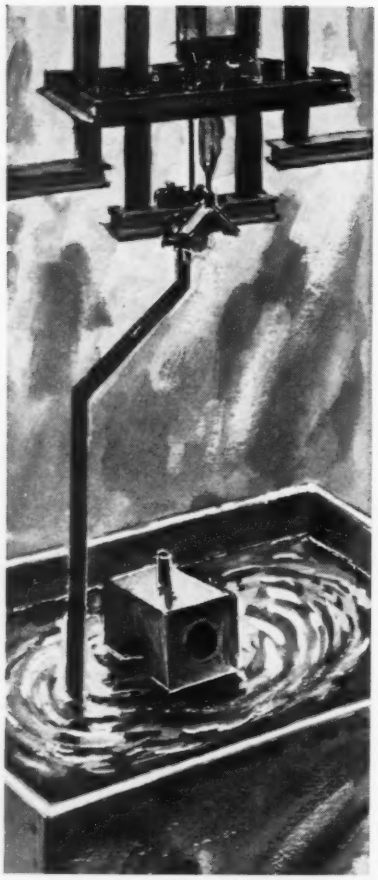


GET THE DROP ON COSTS....

The unique vertical drop section in Rapistan Power-and-Free overhead trolley conveyor gives a new answer to old problems.

It lowers parts to assembly height from overhead storage. It serves processing and finishing stations.

It saves floor and tank space, because a dip tank need be only big enough to contain the part, regardless of dip cycle length.

It saves space wherever changes in elevation are required.

For information on the vertical drop section and other unique features of Rapistan Power-and-Free conveyors, write to Rapistan-Keystone, Inc., 505 Rapistan Building, Grand Rapids, Mich. Ask for Bulletin 2365.

Rapistan®

OVERHEAD CONVEYORS

Circle **92** on Reader Service Card

PRODUCT NEWS

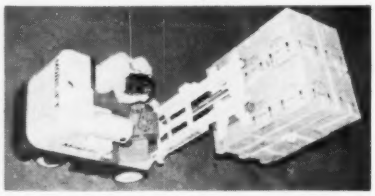
with arms extended, 15,000 lb. retracted. Four-wheel drive and steering, high oscillating rear axle aid maneuverability and traction. Many other features. Choice of engines—diesel or gasoline.

Lull Engineering Co., Inc.

Circle **312** on Reader Service Card

Compact Sit Down

M-40 and 50 lift trucks feature Hydralizer suspension. Each rear wheel suspended separately from oil



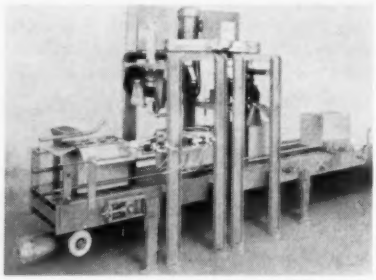
cylinder for stable 4-point support of truck and load on uneven floors. Automatic transmission-and-clutch drive, simple finger-tip controls. Capacities—4,000 and 5,000 lb @ 24 inch center.

Mobilift Division
Motec Industries

Circle **313** on Reader Service Card

4-Flap Case Opener

Compact, vacuum-mechanical Unimatic opens 25 cases per minute. No case turning. Vacuum lifts side and end flaps, mechanical plow completes



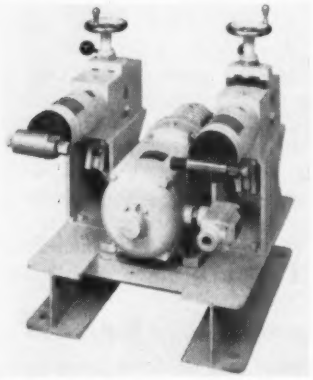
the opening. Handles wide variety of cases and products. May be teamed with maker's uncaser and case packer for completely automated line.

Climax Products Division
Lodge & Shipley Co.

Circle **314** on Reader Service Card

Pumps Compressible Liquids

Line of adjustable-stroke chemical proportioning pumps that deliver small volumes at pressures to 30,000 psi. Capacities from 0.84 to 6.44 gals. per hour. Cylinder evacuates com-



pletely, highly-compressible liquids pump efficiently.

American Instrument Co.

Circle **315** on Reader Service Card

Portable Cold Box

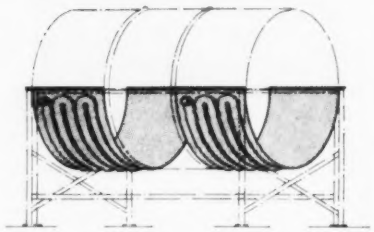
Foam plastic insulated containers in 5 sizes hold frozen goods 36-48 hours without dry ice or other refrig-

eration. Lightweight, sturdy cases of plastic-treated fiberboard or industrial plastic. Easily cleaned with damp cloth. One to 5 cu. ft. capacities.

Polyfoam Packers Division

Circle **316** on Reader Service Card

Drum Heater, Cooler



Panelcoil sections with flow channels embossed on the outside. They cradle drum horizontally, a coil sec-

Continued on page 42

RAPISTAN Ideas HANDLING

STEP-BY-STEP ANALYSIS

can cut your handling problems down to size

As with most engineering problems, those involving materials handling often seem less formidable when they are dissected and examined as smaller units of the overall flow system.

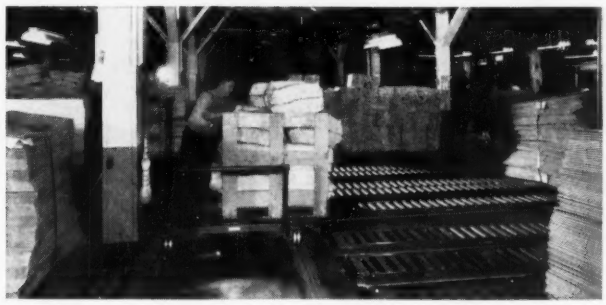
Materials handling engineers refer to this principle as "disassociation of inter-related operations"—and, for all its imposing sound, Rapistan sales engineers apply it effectively to analyze a handling problem and arrive at the most practical and economical solution.

When analyzed in this light, any flow pattern can be reduced to a series of identifiable units of movement, interspersed with related periods of storage. To effect the changes from "go" to "stop" and back to "go" again, a number of mechanical or manual transfers must be provided for. Then, all these inter-related steps must be controlled—unified into a coordinated flow system.

In this plant, live storage Flow Rack at the receiving area holds a reserve supply of many materials ultimately destined for storage at the point of use, to accumulate a full payload for fork truck deliveries to work stations. Notice the unique side-loading device on the lift truck, designed for efficient loading and unloading of hatches in the Flow Rack. Live storage also simplifies inspection, paper work, etc. at receiving department.

When properly "disassociated", operations that may have been considered as units frequently are found to consist of a number of steps. For example, receiving goods into storage may in reality involve 6 or 8 individual units of movement, transfer and storage.

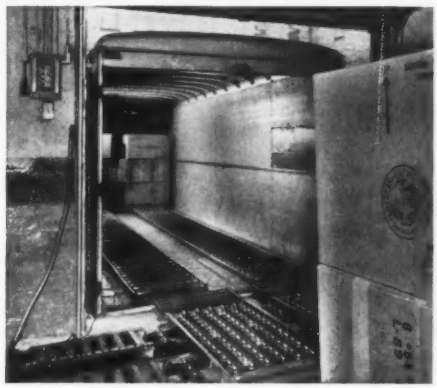
By treating each of these units as an independently solvable problem, within the framework of the overall flow system, Rapistan handling engineers can recommend the method and equipment that will best mechanize each operation, and best coordinate with preceding and subsequent operations.



This large furniture plant has "disassociated" its receiving operations from production operations. In-coming materials are unloaded directly to platform trucks or pallets by truck drivers. Inspection and receiving forms are completed by company personnel when most convenient.

In analyzing thousands of handling problems, Rapistan engineers have found that the vast majority are closely linked to the storage of goods for long or short periods of time. Improvements in accumulation methods, therefore, promise important economies in equipment, time and manpower for materials handling. This is the area of industrial "warehousing" in which Rapistan engineers have amassed a wealth of practical experience and knowledge.

If you'd like to see some practical suggestions to solve your handling problems based on these principles, call your Rapistan sales engineer. Or, write directly to The RAPIDS-STANDARD CO., Inc., 504 Rapistan Bldg., Grand Rapids 2, Michigan, for our "Handbook of Materials-Handling Ideas".



"Disassociation" works in truck loading as well as unloading. Pallet-loads of shipping cases are accumulated on floor-mounted gravity roller conveyor Company trailers are equipped with matching roller conveyor lines, can be completely loaded in less than a minute, in a single operation.

Rapistan®

CONVEYING EQUIPMENT

Circle 91 on Reader Service Card

This easy-opening reusable aluminum top, developed by the Central States Can Corporation, is now available on Cleveland Container fibre cans — a natural for packaging spare parts as well as a wide range of products! It protects the contents from air, moisture and dust. The peeling off of the tabbed seal leaves a smooth edge permitting a snug fit when the top is replaced.

Containers Engineered to Exact Product Needs!

Durable fibre containers can be made to almost any specification — *and at a surprisingly low unit cost!* Moistureproof, greaseproof, and anticorrosive liners for added protection. A wide choice of labels for distinctive identification.

Two Diameters Ready for Immediate Delivery!

An important advantage exists for products which can be packaged in containers with inside diameters of 2⅜" and 3⅞"— two of the most popular sizes.

Write for our latest Packaging Brochure.

THE

CLEVELAND CONTAINER

COMPANY

6201 BARBERTON AVE. • CLEVELAND 2, OHIO

ALL-FIBRE CANS · COMBINATION METAL AND PAPER CANS

SPIRALLY WOUND TUBES AND CORES FOR ALL PURPOSES

CLEVELAND CONTAINER CANADA, LIMITED

Plants & Sales Offices: Toronto & Prescott, Ont. • Sales Office: Montreal

Plants and Sales Offices: Cleveland, Chicago, Memphis, Dallas, Los Angeles, Plymouth, Wis., Jamesburg, N. J., Greensboro, N. C.

Sales Offices: Detroit, New York City, West Hartford, Rochester, N. Y., Washington, D.C. • Abrasive Division at Cleveland

Circle **26** on Reader Service Card

PRODUCT NEWS

tion at each drum end. Hot water or steam to 125 psi or coolant flows through the panels for heat exchange. Drum contents may be drained from middle or end. Drum replaced quickly. Coils come ready to mount on any support or as ready-made unit.

Dean Products, Inc.

Circle **317** on Reader Serviec Card

ANYBODY'S PRIVILEGE

You may request more data on any item in this magazine that has a Reader Service Number by circling that number on the Business Reply Card, regardless whether or not you are the subscriber to whom the magazine was addressed.

Handles Hot Coils

Line of 4-pole magnets for faster, safer handling of hot or cold steel coils (on end). Capacities to 80,000

lb. Each pole a separate magnet, wiring completely enclosed and watertight in stainless steel enclosure. Heat barriers protect magnets, works well to 1,200° F.

Stearns Magnetic Products

Circle **318** on Reader Service Card

For more PRODUCT NEWS turn to page 97

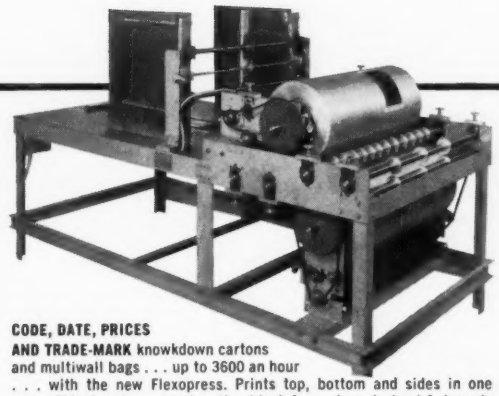
Do you have a

1961 PACKAGING LINE

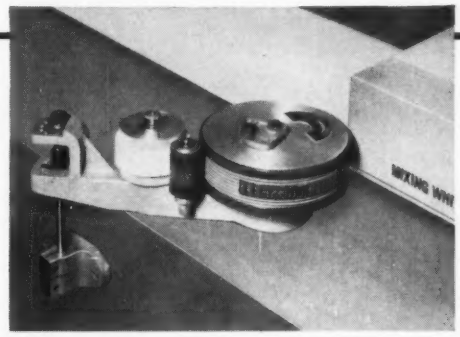
with an 1890 marking set-up?

Don't shackle your packaging line with an obsolete marking system. Look into the four IME imprinters on this page. All four synchronize to the speed of the line. All work smoothly, print distinctly, save you and customers time and bother. All offer heavy-duty construction for first-rate performance.

1961 packaging demands 1961 marking: IME marking. Performance guaranteed. For detailed, illustrated brochure write today. Dept. MHE

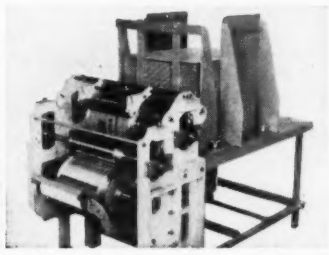


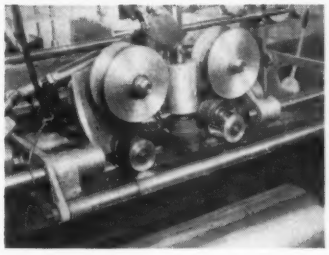
CODE, DATE, PRICES AND TRADE-MARK knowkdown cartons and multiwall bags . . . up to 3600 an hour . . . with the new Flexopress. Prints top, bottom and sides in one pass. Attaches to present units. Ideal for web and sheet-fed work, handling webs 1½" to 100" wide. Open-fountain inking system. Removable plate cylinders for off-press registration. Available in self-contained or "attachment" models.



PRINTS boxes, cartons and containers at production-line speed, whatever that speed may be. The Whippet® conveyor-line marker will mark all that passes it . . . easily adapted for top or side marking, too. Interchangeable type. Easy to maintain.

MARKS UP TO 3000 PER HOUR CARTONS AND BAGS AUTOMATICALLY: the #7 Autoprinter® Prints well on nearly every flat, absorbent surface, does one or both sides in one pass. Ink dries fast, doesn't cake . . . no need to clean rollers after use.





PLASTIC FILMS, FOIL, VIRTUALLY EVERY MATERIAL used in hot roll leaf imprinting can be clearly, colorfully marked with a Rainbow coding attachment. Wide range of colors. Ideal for both continuous and on-and-off work. 250 sharp impressions: only 1¢. No operator, no makeready.

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TENNANT "85" SWEEPER *pays for itself fast...*

sweeps a full mile of aisles in less than 30 minutes!

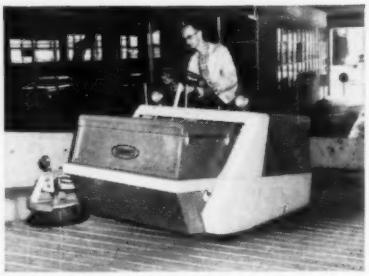
Gliding swiftly over your floors, this all-new, superbly engineered TENNANT "85" Sweeper *sets a new standard in cost-saving cleanliness* . . . plus heavy-duty dependability for *any* job.

In 30 minutes, for example, it easily sweeps a full mile of 8 ft. aisle . . . or over 100,000 sq. ft. per hour in open areas. Leaves an ultra-clean 53″ path.

Saves up to 60% in hand-sweeping costs, doing the work of 3 to 12 men. New hydraulic drive, floating brush and simple controls make it easy to use. Your operator does a top notch job the first time.

New features assure exceptional cleanliness, plus added capacity for difficult jobs. *Examples:* Largest filter (66 sq. ft.) on any industrial sweeper . . . powerful 18 h.p. engine . . . new constant-speed brushes and vacuum . . . 16″ wheels for good traction on ramps.

100% mechanized operation saves time. Single pedal for forward-reverse; just touch button to clean dust filters; twist of knob dumps 800 lb. load. *Usually pays for itself in less than a year.*



HEAVY-DUTY "85" has ample power for grueling use on ramps and inclines and over bumpy pavements. Path swept (53″) is ideal width for sweeping most factory aisles in one round trip.

NEW BULLETIN gives full details on how the "85" slashes sweeping costs. To receive it, simply clip this ad to your letterhead, jot down your name and title and mail to G. H. Tennant Co., 707-E No. Lilac Drive, Minneapolis 22, Minn.

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FLOOR MAINTENANCE SYSTEMS

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CALENDAR OF EVENTS

May 9-11

MHI Eastern States Show
Trade & Convention Center
Philadelphia

May 11-13

12th Annual Conference and Convention
American Institute of Industrial Engineers
Sheraton Cadillac Hotel
Detroit

May 22-25

Design Engineering Show
Cobo Hall
Detroit

May 22-26

Tool Exposition
American Society of Tool and Manufacturing Engineers
New York Coliseum

June 1-3

MHEDA Seventh Annual Convention
Denver-Hilton Hotel
Denver

June 11-23

Industrial Management Center Courses
Lake Placid Club
Essex County, N.Y.

June 13-16

Cornell University Industrial Engineering Seminars
Ithaca

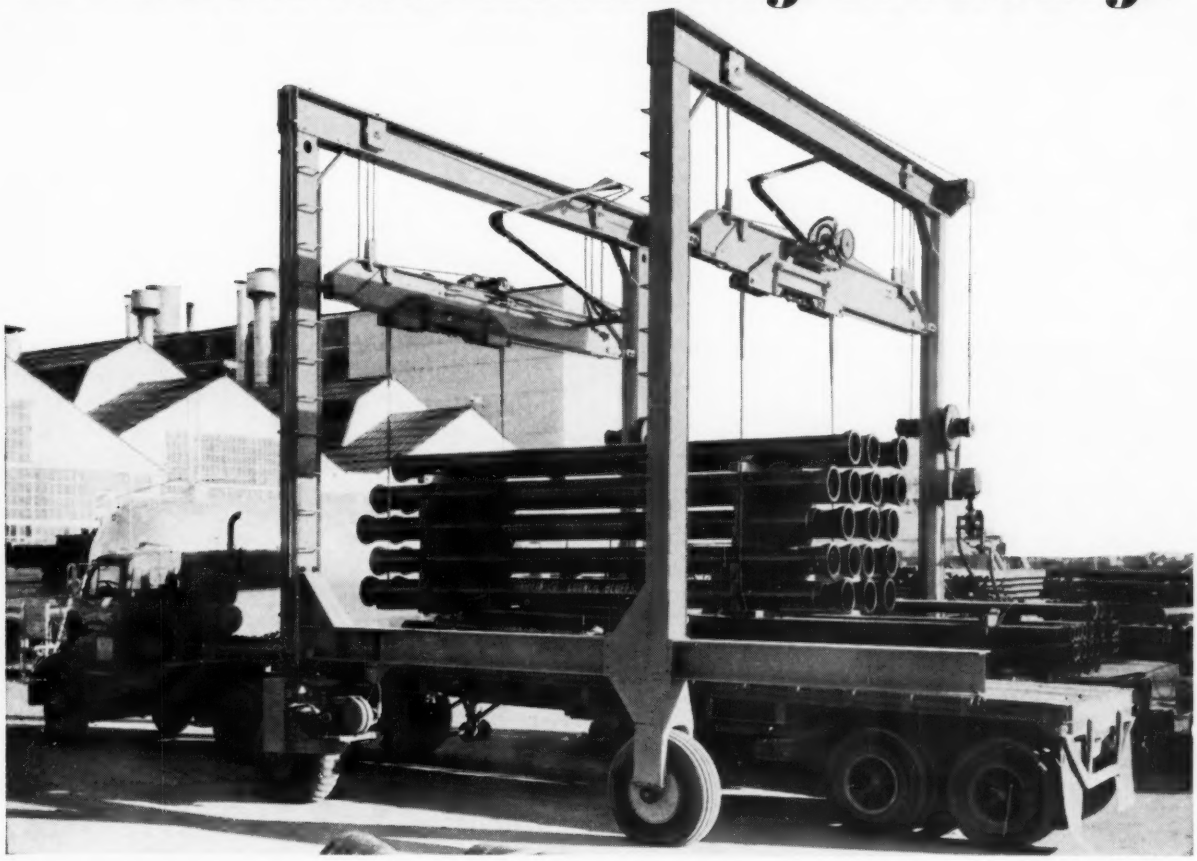
June 28-30

Joint Automatic Control Conference
The American Society of Mechanical Engineers
University of Colorado
Boulder, Colorado

July 18-20

Western Plant Maintenance & Engineering Show
Pan Pacific Auditorium
Los Angeles

Travelift...the versatile new way to materials handling economy



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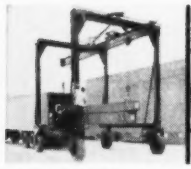
Travelift gives you the ultimate in versatility.

- It can be self-propelled, truck pulled or operate in a fixed position.
- It handles loads from 3 to 50 tons.
- It comes equipped with single or multiple lifting points.
- Travelifts can traverse and even pinpoint a load to spot it on a dime, gently.
- Once more, every operation is hydraulically controlled by *one* man from a full view platform with every control under his thumb for complete command.

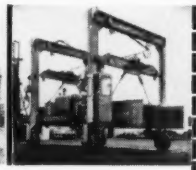
Take a look at your present materials handling equipment. Are you getting this all around versatility or are you about to write for full details on this *new* way to materials handling economy?

Over 17 models to choose from — at a lower cost than you think. Most models cost less than $1,000 per ton of lifting capacity . . . at no sacrifice in quality.



Caution! Too fragile for fork trucks, handle with Travelift. Here tons of wire cloth are loaded into a closed trailer.

Travelift carries this large tank smoothly and safely even over rough terrain.



Travelift combines brute strength with flexible handling to move this fabricated member.

Travelift Division of DROTT Mfg. Corp.
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Please RUSH full information on Travelift.

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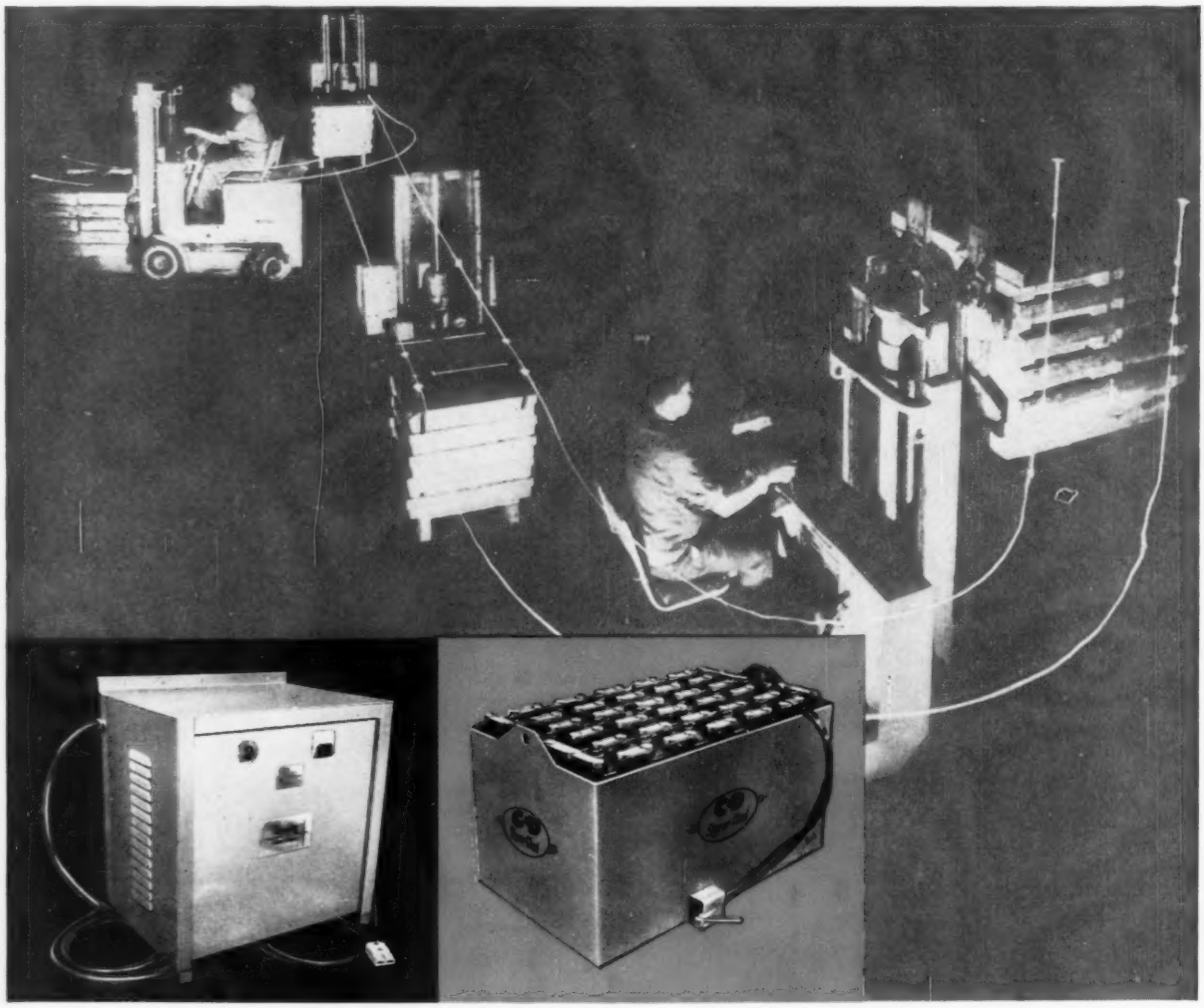
For Profit in materials handling! Use quiet, compact electric trucks powered with C & D *Slyver-Clad*® batteries—charged by *AutoReg*®!



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Circle 15 on Reader Service Card

Material Handling Engineering

MAY 1961

GUIDE TO IN-PROCESS HANDLING

Manufacturing is the moment of truth for material control.

New production machines demand material at fast, precisely-controlled rates. Handling must keep pace.

These machines spew forth an endless ribbon of scrap that has to be caught up and handled to make elbow room for production.

Electronic controls make possible the automatic handling of material in manufacturing, and provide a tight rein on in-process inventory. Mechanized assembly operations and highspeed automatic packaging complete the story.

And it's all tied together with planning. The kind of planning that helps you to know what your material flow requirements are, and what kind of mechanization program will fill these requirements.

Another part of this planning involves taking a hard look at the cost of your present handling, followed by a realistic appraisal of a new system. This is planning based on facts, figures, and experience—wishful thinking plays no part in it.

That's what this Guide Issue is about: the material handling and control viewpoint on manufacturing. Here is a starting point for the extensive study and work you must do to improve your company's competitive position and further your own career.

Material control— the key to manufacturing

How can a company reduce in-process inventory and cut handling expenses? Answer: keep material on the move. Don't have intermediate pools or excessive storage areas.

You can reduce your in-process inventory by aiming for a balance in manufacturing operations. Get as much of the manufacturing process in one line as you can. Aim for a start-to-finish process. Keep it in one building, avoid transfers. And you have to have your material handling system keyed to your production rate. If a hopper that feeds a machine is too big, so's your inventory. Strive for balance between too large and too small ready storage. And most important of all, make your vendor be your warehouseman for production stores. The trend is to exploit this to the highest degree. Suit your purchasing to your manufacturing. Aim for almost daily shipments from your vendors.

In the March issue of Material Handling Engineering, E. Ralph Sims, Jr. in "How Material Control Aids Your Company Operation" described the advantages of maintaining inventory in the manufacturing operation rather than in finished products. Here this theory is carried further to move the inventory out of manufacturing stores to the vendors' plants. Both concepts lead to the ideal of inventory elimination. Both ideals must be modified, however, by many of the conditions mentioned in this article.

Inventory must be regulated to the production of each particular company. You have to know how much you need and the lead time for materials. Some vendors push users to take larger carload lots at a price. But the rule is to realize that the attractive carload price is NOT the full price to lay the material at the production line. If you have to rehandle the material a couple of times, you have to add this cost. The cost of maintaining a raw material inventory can add up to 24 percent of its value per year depending on the item.

Things to consider when you order raw materials:

- There may be a delay in the material delivery.
- You may need it sooner than expected.
- The material may not meet specifications when delivered.

It usually pays to schedule the delivery of the material before you put it to use. You have to balance the safety period against inventory costs as defined by the systems concept of handling. You consider what you can afford in inventory investment.

Some companies go to extremes trying to predict a customer's demands and to give him fancy service. The trend, however, is to give a little less of this service and to lower the price. Don't maintain an inventory to take care of every imaginable demand. Custom-make unusual items. What if the customer has to wait a week longer. He'll still like your cheaper price.

A good rule to remember: If you reduce in-process time by an hour or a day, you have reduced inventory by that time also. Promote material flow through in-process handling.

If you're out-of-balance on your inventory, you'll be faced with:

- Lost time on production lines.
- Extra handling due to incomplete operations. Production will be on-again, off-again.
- Labor troubles. Production workers have to be reassigned when production stops.

How do you determine the best rate of flow? It's determined by the rate of shipments as set by sales. You start there and determine the number of units required for sales, and break this down into component parts. You determine components, and then the manufacturing capacity needed to produce the units. You adhere to sound manufacturing methods to reach this output demand.

The degree of continuity in operation depends on manufacturing costs. How high an hourly rate of production do you want? What about two shift operation? You have to consider shift differentials. Not to be forgotten are plant costs of heating, lighting. Do you want to make it seasonal work, say for a 6-month period, or stretch it over a year. This of course, affects the rate of flow. Some companies have a choice here, depending on their product. Seasonal employment and production reduces inventory costs, but in many instances increases labor costs.

LINEAR PROGRAMMING SELECTS A STORAGE LOCATION

There are four items to be stored in three locations.

Items	Length of Time to be Stored (Months)	Cubic Yards Space Required	Costs per Cubic Yard of Moving to and from Storage (Dollars) I	II	III
A	2	200	0.60	0.24	0.48
B	6	300	.48	.18	.48
C	1	300	.42	.18	.36
D	3	400	.72	.36	.54
Cubic Yards Space Available			400	200	600

Divide the handling cost per cubic yard by the number of months the item will be stored. Then scan these answers.

Item	Required Space	Costs per Cubic Yard of Moving to and from Storage Per Month Stored (Dollars) I	II	III
A	200	0.30	0.12	0.24
B	300	.08	.03	.08
C	300	.42	.18	.36
D	400	.24	.12	.18
Cubic Yards Space Available		400	200	600

The next move is to set up a Modi Matrix.

Item	Storage Area / Column Values / Row Values	I $.30	II $.25	III $.43	Required No. of Cubic Yards
A	$.00	200 .30	.12	.24	200
B	.22	200 .08	100 .03	.08	300
C	.07	.42	100 .18	200 .36	300
D	.25	.24	.12	400 .18	400
Available Number of Cubic Yards		400	200	600	1200

This matrix gives feasible, but not an economical, assignments of items to storage space. The values in the angles such as .30 are called "Square Values." The row and column values are computed from the square values where an assignment is made. They are developed from two rules: 1. An arbitrary value, (zero.) is assigned to one row. 2. The sum of the row and column values for assigned squares must equal the square value.

An improvement can be made in the assignments if the sum of the row and column values is larger than the square value of an unused assignment.

Material Handling Costs Per Month Of The First Assignments

Item	Cubic Yards of Space Used	Storage Area	Cost Per Month
A	200	I	$.30 x 200 = $60.00
B	200	I	.08 x 200 = 16.00
B	100	II	.03 x 100 = 3.00
C	100	II	.18 x 100 = 18.00
C	200	III	.36 x 200 = 72.00
D	400	IV	.18 x 400 = 72.00
			Total $241.00

The variable material handling costs for this group of assignments are $241 per month. If you study these assignments, you will see some obvious improvements. For example, using 200 cubic yards of II for A and 200 more cubic yards of I for B, saves $36 per month on A and increases costs $10 per month on B. The best assignments are shown below.

Best Assignments

Item	Storage Area / Column Values / Row Values	I $.08	II $.16	III $.02	Required No. of Cubic Yards
A	$.22	.30 .30	.12 .06	200 .24	200
B	.00	300 .08	.03 .16	.02 .08	300
C	.34	.42 .42	200 .18	100 .36	300
D	.16	100 .24	.12 .00	300 .18	400
Available Number of Cubic Yards		400	200	600	

The costs of material handling per month with these assignments is $222.

$.08 x 300 =	$24.00
.24 x 100 =	24.00
.18 x 200 =	36.00
.24 x 200 =	48.00
.36 x 100 =	36.00
.18 x 300 =	54.00
Total	$222.00

The square values of the unused assignments are circled. In two places I-A and I-C, the sum of the row and column value is the same as the square value. This indicates that this combination of assignments can be used without increasing costs.

There are three main tools to help you with in-process inventory control. They are linear programming, inventory management, and process engineering.

Linear Programming

Most companies have several sizes and types of material handling equipment. The time required to handle a specific lot of material may depend on the equipment assigned to the job. Sometimes there are too many work assignments for the most efficient equipment and you have to use less efficient machines that are on standby. Then someone has to select the jobs to be done by the equipment.

You get nearly the same problem in assigning high-cost storage space. Again, the question is, which items should you keep in the expensive space. Those who have had these problems well know that it's difficult to find satisfactory answers to these questions.

Often you can use a simplified form of a mathematical technique called "linear programming" to find the answer to these questions.

This technique requires knowing the variable part of the costs of moving material with the available equipment and storing material in the available locations. The words "variable costs" are used advisedly, because we are interested only in that part of the costs that will change when there is a change: in the equipment used to handle material or in the location used to store material.

Space does not permit giving a description of the technique here. You can find a description of it in "Linear Programming—Fundamentals and Applications" by Ferguson and Sargent, published by McGraw-Hill Book Company. This book describes the technique in terms that a layman can understand.

Through linear programming, you can figure out how to bring the proper amount of materials to machines at proper times for best production.

Through linear programming you can:

- Know when the best schedule has been reached.
- Determine the total time required so that machines and manpower can be allocated better.
- Know the best alternative schedules easily and quickly should production be interrupted.
- Know the advisability and economic justification for adding to present equipment or facilities.

Inventory Management

Another device is inventory management. It's something more than inventory control. Management of an inventory is the management of a great many investments. Each investment must bring in returns in the form of better service to the customer, lower selling costs, and lower operating costs. Inventory management gets into formulas to determine inventory levels. Inventory management provides tools for keeping the amount of an inventory at the right level.

In inventory management, the material that comes into and goes out of the inventory is the turnover component of the inventory. The material that is planned to be on hand when replenishment material comes into inventory is called reserve component.

Naturally, the amounts of the order point and order lot quantities and the length of the manufacturing cycle affect inventory amount. Inventory management takes remedial action on these matters: Why is the amount of the inventory where it is? What it is? Answers involve turnover, reserve excess, in-transit, surplus, and miscellaneous components.

Process Engineering

The third tool to help you with inventory control is process engineering or processing. It consists in analyzing a given manufactured item to ascertain what must be done to it, and specifying operations and sequence for most economical production.

The process engineer must have a thorough knowledge of the equipment available, and its capabilities for production. He must also have a good idea of the time required to do any piece of work on any machine. He must have a thorough knowledge of tool and machine costs, tool life, and he must know the accuracy obtainable in various methods of doing the work. Remember: the process engineer can reduce your in-process material. Use him.

Purchasing and Material Handling

The purchasing department and the material handling group should closely cooperate to simplify handling problems. The purchasing department can require suppliers to furnish materials in a package that will be convenient to process through a plant. An integrated unit load system in which a supplier provides the raw materials on pallets is one method. (See "Do Incoming Materials Come In The Best Package For You?", MHE, Jan. '61.)

The material handling function can reduce production costs by cutting the amount of handling as material moves through the production process. The best routing will determine the handling equipment to be used. The scheduling group must be familiar with material handling in order to allow time to move the materials from one operation to the next in the most economical way. It does no good to schedule work on machines if the work in process isn't moved to the next operation and available on schedule ♦

JOHN D. LUCAS, *Senior Consultant, H. B. Maynard & Co., Pittsburgh*

"Good process engineering and good material handling engineering will make processing-on-the-move a reality and will reduce handling costs. Whenever possible, make your vendor do your pre-production storing. This will reduce your inventory costs. If your plant is hampered by the limitations of old buildings, if your plant just grew, or if you have a plant where material handling isn't integrated with the basic manufacturing system . . . then you can lower your handling costs by considering this approach.

It's in the complexity of manufacturing or processing that handling often becomes obscured. In the face of increasing costs, the ultimate solution is in the complete new facility—the plant of tomorrow. This calls for real integrated handling based on the concept of a complete producing unit, planned with an eye on the full effect of each single function on all other functions. Production processes may even be modified to tie them in better with material handling. Keep processing on the move, with coordinated flow lines extending from the raw material source through all phases of receiving, storing, processing, warehousing and shipping, and to distribution centers."

STEPS TOWARD MECHANIZATION

- **Know your product. Look at it objectively.**
- **Change design for easier handling if you can.**
- **If not, try to live with what you have. You'll have lots of company.**
- **Aim for a uniform product flow. Intermittent handling will give you the mechanization bends.**
- **Plan to keep your product on the move through the line. Don't put it down.**
- **Mechanize in pieces if you must. But plan from beginning to end.**
- **Mechanize the costliest steps first.**
- **Test your ideas first on the part of the process most prone to fail. If you can't lick that one, you've saved yourself a lot of time and money.**
- **Work our your production and handling in simple steps a machine can perform.**
- **Don't overcontrol. Decide how much information you really need and plan for that alone.**

Evaluating and planning a mechanization program

YOU'LL MECHANIZE to make money, not to develop a handsome production line nor to keep up with the industrial Joneses. Do it right and become a hero. Do it wrong and you'll spawn an expensive monster.

You might mechanize for safety, but this is not general. Money is the root of most mechanization. We pay full tribute to this in another article in this issue, "How To Count Your Profits Before They Hatch." So let's confine ourselves here to evaluation and planning. Examine these:

NEW PRODUCT VS. OLD—Are you starting with an original product, unbound by tradition? Or have you a product already on the market? If so, are you free to take an entirely new look at your product? Or are you hemmed in by customer acceptance, current methods, and unamortized machinery?

HIGH VOLUME VS. LOW—Do you handle large quantities of the same product or do your products vary?

STRAIGHT-THROUGH VS. INTERMITTENT—Can you handle your product with continuity or must you store it between operations?

TOTAL VS. PARTIAL MECHANIZATION—Dare you mechanize the entire system or must you content yourself with mechanizing only the expensive or troublesome steps?

MECHANICAL VS. ELECTRONIC CONTROLS—Can you run your process with simple mechanisms or must you use computers, transducers, photo cells, and the like?

Almost any process can be mechanized. You may already feel the pressure to mechanize, feel that failure to do so will leave you out of the industrial swim. One authority says numerical tapes will control all metals industry machines by 1965. Another sees a surge to mechanization based on population figures. He says 60 million will be added in the next 20 years, but the work force will remain the same size as today's. He forecasts the biggest push in product assembly and its handling, the area he calls one of the most neglected in the factory.

Start Here

If you have an inner urge to mechanize, look first at what you make. Look objectively. See your product as though for the first time. Can you change it so it will handle easier? If so, you're lucky.

Most of us can't. We're straightjacketed by a combination of design (grandpa made it that way and what was good enough for grandpa is good enough for us) and customer acceptance. So we must deal with the present product as it stands. That means we're probably stuck with a series of manufacturing steps going back to antiquity. Even where we have

some machines doing the steps, we're hampered by the tendency to design them to duplicate the motions of human hands.

Perhaps we should say goodby, Grandpa, and start over. For example, they used to sew on men's shoe soles by hand. Then they developed a machine to do it. Then they got smart, realized they didn't have to sew with a continuous thread but could cement the soles on. This changed the operation from whir, whir, whir to a simple kerchunk! What a fascinating complication of steps to arrive at a simple solution!

We're fortunate if we can throw out the old system and begin again. Usually we can't. But this doesn't mean we can't mechanize at least a little. Many industries—is yours among them?—are on the verge of full transition from manufacturing based on traditional hand methods to manufacturing designed for full mechanization.

Recognize Your Limitations

So you want to develop a good mechanical system. But you have $250,000 worth of equipment only one-fourth amortized. You're stuck with most of this and had better use it in your automatic system.

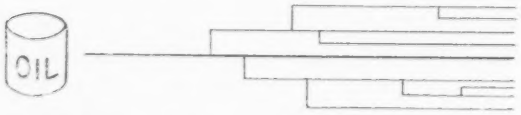
Also, you have a product that's pretty well known and accepted by customers. Minor changes would make mechanization simpler and cheaper. But, chances are, you're stuck with your product and with a lot of the machinery that makes it.

What's more, you're probably stuck with an old building that may limit the extent of modernization you would like.

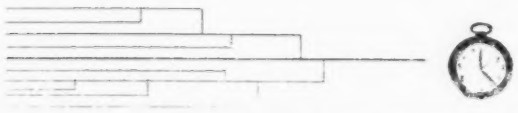
It will help greatly if you look at mechanization through something more than eyes of pure engineering. Develop your mechanical ideas—by all means! —but against an administrative and executive background. You'll hamper yourself if you fail to work in a management point of view with your engineering ideas.

Flow or Intermittent?

Mechanization experts pretty well agree you should aim for a uniform rate of product flow. Object: To send the same amount of material through the production and handling pipe each hour. Consider the three general manufacturing and handling sequences:



1—Single material makes many products, like oil.



2—Lots of parts make one item, like a watch.

3—One item goes in and one comes out, like cotton into thread.

These diagrams, or segments of each, are like pipelines. You must take out as much as you put in. So it's sensible to step production and handling at as nearly uniform rates as possible. Another way of looking at this: Use as little intermittent processing and handling as possible. Otherwise, you get tangled in inprocess storage.

It's ideal to arrange your process so that your system holds the raw product all the way through each step to shipping, without putting it down. Every time the system must stop, say for a worker to find something to go on the item from a parts tray, you're running up the costs.

Another consideration: Design your product with some handles on it. That is, make it of a shape the machine can grab easily.

If you buy components, try to receive them in a versatile container, one that can double as a feed hopper, and inventory aid, a storage container, possibly even as a final shipping box.

Planning Your Mechanization

It's ideal but not necessary to mechanize your processing all at once. Often you can't, because you're probably limited in the amount you can spend. But, which ever way you do it, plan your system from start to finish.

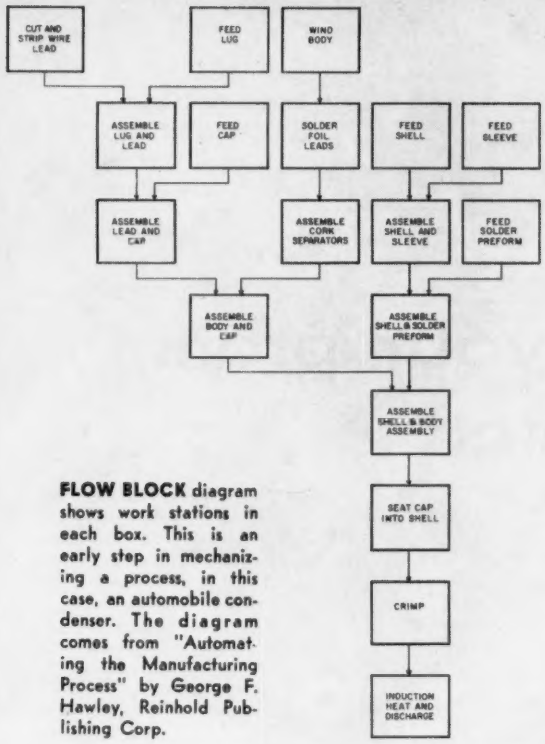
Here's why. You may have a good idea. However, your firm may reject it because it's revolutionary,

"Our approach is sharply focused on mechanics. We get down to hardware as early as we can. If we can do it mechanically (as opposed to electrically, pneumatically, or hydraulically) we find it can't help being simpler and usually cheaper. Also, it will run for 100 years."

—GEORGE F. HAWLEY, *director of development and engineering, Automation Engineering Laboratory, Stamford, Conn.*

all-encompassing, or costly. Better to get part of the idea accepted and used. Then maybe you can complete the system later. But to do this right, plan the entire project from the first. (See "*Why Buy A System*" in MATERIAL HANDLING ENGINEERING, January 1961).

There are positive advantages to step-by-step mechanizing. You may find some things look good on paper but ought never to be mechanized. For example, it would be foolish to mechanize a process that you know will be obsolete before the machines are paid for. And, too, some processes are so difficult, it makes



FLOW BLOCK diagram shows work stations in each box. This is an early step in mechanizing a process, in this case, an automobile condenser. The diagram comes from "Automating the Manufacturing Process" by George F. Hawley, Reinhold Publishing Corp.

sense to ignore them when first considering mechanization. Also, you may need the worker instead of the machine because he monitors or inspects, does it cheaper than a machine. For example, you want to weed out substandard items from a parts feeder. It might cost a fortune to do this mechanically.

One Way To Go at Mechanization

One experienced consultant chips away at the big bugaboo of mechanization: risk. This is the possibility the system, or some part of it, will not work. His planning attacks the portion of greatest risk first, but in a way to enable the manufacturer to put out the least money and still find out what can and can't be done. Here's how this consultant does it.

He meets with the manufacturer to find out what he wants. After looking over the product and methods, he makes a general plan. He makes a flow block diagram, with work stations in each box. (See diagram on this page). He goes into some detail on each work station, shows how each works but not down to each sprocket, gear, and pulley. He also includes in his plan 3-dimensional sketches of the mechanical ideas, without exact features.

He writes a survey on the economic impact of mechanization to the manufacturer, savings in employes, materials, and other pertinent features. From this, and the plan, he says, the manufacturer discovers early whether the consultant knows what he's doing. The consultant tries, where possible, to include alternate ways of doing the same job, positions of retreat, so to speak, should the first ideas fail.

Also in the initial study, he lays out a schedule of attack. For example, he may divide the system into seven functions. He may feel No. 4 is the riskiest. So he works out the details of No. 4 first because without it there may be no use mechanizing the remainder. If No. 4 fails to work he saved the manufacturer the cost of the other steps right off the bat.

Now comes the key to this consultant's method. For every basic idea he makes a working model, one that really works, he emphasizes. These need not be complicated. You can substitute a hand crank for a motor. But be certain that you build it of similar material to that planned for the final machine.

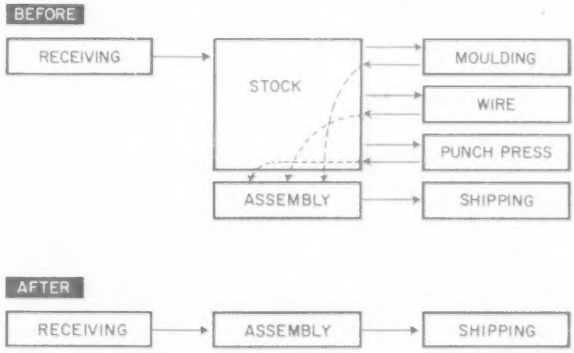
He admits model building isn't cheap. But, he asks, what's a couple of thousand dollars for a model when it insures a workable system that may cost $250,000? Ever seen an expensive machine rusting away in a plant because it wouldn't work? It was built, he says, without the experience a model could have provided.

When all the models for a mechanized system are built and proved to work, the manufacturer can feel secure. From here it takes engineering and design to produce the final system. Once again, he suggests, first build and test the machine that's least apt to work.

Another Way To Hit the Mark

One company provides the components for straight line production and mechanization but backs away from the engineering. For example, they recommend the manufacturer's subdividing production into simple steps. Then he uses their standard components to build a production line. (See diagram below.)

Key to the system is flexibility. If one way doesn't work, try it another way because everything switches



MATERIAL FLOW by the old method was full of inefficiency, unnecessary handling, movement to and from departments, in and out of the stockroom. It kept inprocess inventories high. The simpler, mechanized process flows in a straight line. This diagram was devised by Alden Systems Co.

around easily. They mount machines on panels that fit standard worktables. They can move the panels, change their sequence in the line.

Work transfer also is standard but flexible. As fast as a machine completes its job on an item, it passes to the next step without stopping. They use a number of work transfer devices, small conveyors, parts containers, and carts that bring material to the line from receiving.

The firm suggests keeping heavy production machinery mobile instead of bolted to the floor. This enables you to put together a new line much easier. ♦

How to count your profits before they hatch

Evaluating a mechanization program and selling it to management

". . . he knows the price of everything and the value of nothing . . ." *Oscar Wilde*

WHAT you *pay* for the equipment that makes a system is one thing.

What it *costs* you is quite another.

One system can earn a lot of profit, the alternative can earn little or even lose money. If you choose the alternative, the gain you pass up is the price of your error. To make the right choice you have to estimate earnings in advance. To get management to accept the right choice you have to be able to prove your estimates are valid.

Of course you start by getting the price of the equipment in your mechanization program and the cost of installing it. This is tedious work, but not complex, and experts in your purchasing department can handle most of the details. See also our suggestions in "The High Cost of Free Engineering," MATERIAL HANDLING ENGINEERING, April 1960.

Four Ways To Forecast

Equipment prices are only a starting point in finding the true cost of equipment, and how you process your price figures is up to you. Experts differ sharply on methods. You might expect guidance from your accounting department, but they may cloud the issue if they insist on retaining certain concepts which are necessary in accounting practice, but which obscure the very facts you need to discover. There are four methods of forecasting how profitable equipment will be; none is based on accounting procedures. They are: (1) Payoff Period Method; (2) Estimating Return on Investment; (3) MAPI System; (4) Discounted Cash Flow Method.

What These Methods Do

By each of these methods you can estimate how various factors influence the profitability of equipment. Some of the factors are:

- Changes which the equipment will make in *volume* and *quality* of your output
- Salvage value of the equipment you replace
- Salvage value of the *new* equipment when it is finally retired
- The cost of your equity capital
- The cost of your borrowed capital
- Property taxes
- Income taxes
- How long the new equipment will serve
- Your amortization method
- Effect of the new equipment on inventory
- Capital expenditures you will have to make if you do *not* adopt the equipment under consideration.

FIGURE 1. PAY OFF PERIOD COMPUTATION

	Age:	Present Machine (5 years old)		Proposed Machine
First Cost	1a)	$20,000	1b)	$30,000
Annual Costs				
Hours of operation	2a)	2000	2b)	2000
Direct Labor	3a)	$4000	3b)	$1000
Maintenance & Repair	4a)	300	4b)	200
Power	5a)	1800	5b)	2000
Depreciation, Straight Line, 10 years	6a)	2000	6b)	3000
Interest on Undepreciated Investment, 6%	7a)	600	7b)	1710
Burden	8a)	300	8b)	260
Floor Space Cost	9a)	400	9b)	350
Property taxes and insurance	10a)	1000	10b)	3000
Totals	11a)	$10,400	11b)	$11,020
Salvage value, old machine	12a)	1020		
Net total, new machine			13b)	$10,000
Output rate, units	14a)	14 per hr.	14b)	20 per hr.
Cost per unit	15a)	37.14¢	15b)	25.0¢
Total advantage		((15a - 15b) x 14b x 2a) = $4856 per year.		

Approx.* payoff period (($10,000/$4856) x 12) = 25 months.
*Without adjustment of depreciation, etc., for 2nd and 3rd years.

Fig. 1—A PAYOFF PERIOD COMPUTATION. Note that this is biased by inclusion of depreciation.

FIGURE 2. RETURN ON INVESTMENT

Machine costing $2200. Anticipated life 5 years. No salvage value.

Year	Gross Earnings of Machine before Depreciation (Taxes deducted)	Unamortized Balance of Investment	Earnings after Amortization
1	200	2200	0*
2	600	1760	0*
3	800	1320	280
4	1200	880	760
5	1200	440	760

Average investment $1320
Average return on investment: 27.2%
*Deficit of earnings against amortization charged to subsequent years.

Fig. 2—A SIMPLE RETURN on Investment computation.

Your reason for considering all the factors is simple. You want a YES or NO answer to the question –

Should we buy the proposed equipment?

You may also want to know which of several proposals is best.

Each method may give a different answer. A description of them explains why:

I. Payoff Period Method

This is also called "payout time" or "economic study." Figure 1 shows the computations. There is no commonly accepted standard for the factors to be included in this kind of reckoning, which is one criticism of it. A more serious shortcoming is the assumption that a machine is likely to be the best buy if it pays for itself rapidly. A "payoff period" estimate may tell you to buy a ramshackle machine which will pay for itself in 18 months, but which will be ready for the junkman in 24 months. If you follow this indicator, you may pass up the purchase of a better machine, which will take 24 months to pay off, but which will continue to produce substantial earnings for a decade.

II. Return on Investment

In using this method you consider the equipment as an investment, like money put into a mortgage loan. The earning of the machine can then be figured like the interest and amortization on a mortgage. You choose the equipment, or system, which gives you the highest interest rate. If the figures you start with are as crude as those for an ordinary payoff period computation, then the only advantage of this method is that it takes into consideration the length of time the equipment will serve. In practice those who use the return on investment method tend to consider additional factors, making the computation more complete. If they are skillful the results are useful. Critics object rightfully, that the method depends on the way the estimator juggles the figures. It gives misleading results if unskillfully applied. Figure 2 shows a primitive application of this system. To overcome the short-comings which this demonstrates experts have devised better systems, such as–

III. The MAPI System

This was developed by extensive research carried out by the Machinery and Allied Products Institute. It provides for systematic inclusion of more than 20 factors influencing the profit to be expected from equipment. While it requires some estimating (as do all forecasts–none can be made without guessing at probable operating rates, salvage values, etc.), it enforces the use of an orderly and valid method of computation. Figure 3 shows the forms used. The third of these, a set of curves which provides multipliers that take into account obsolescence, deterioration, their effect on income taxes, etc., is the heart of the MAPI method.

Two criticisms are leveled against this method. One is that it is not simple. This objection would seem to have little justification. The forms make the figuring easy, and if it takes work to get the facts needed for the analysis, you have to remember that a big investment deserves a little work. The second criticism is that the MAPI System does not enable you to compare an investment in equipment with some alternate expenditure not for equipment, such as bond retirement. In practice a simple adjustment makes the figures comparable.

In its favor advocates of the MAPI method can show evidence that it overcomes most of the disadvantages of the methods it is designed to replace. It works. Companies which use it check its results against

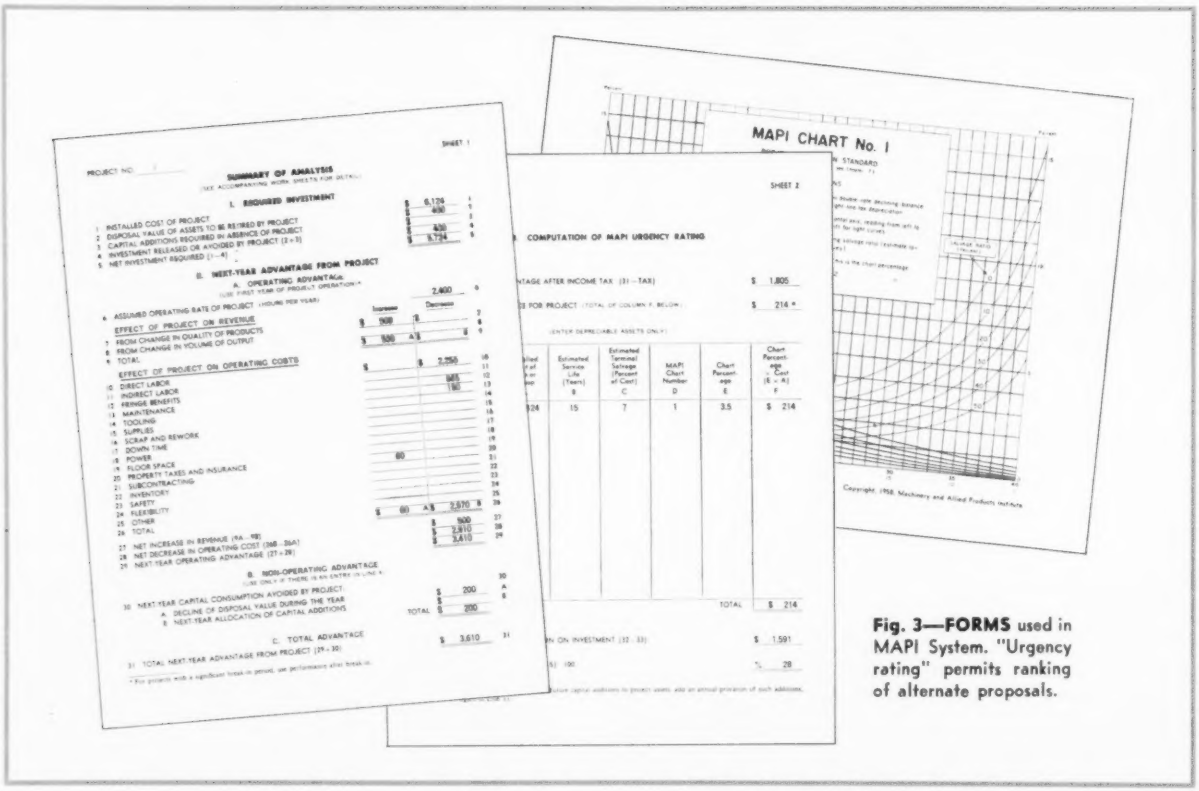


Fig. 3—FORMS used in MAPI System. "Urgency rating" permits ranking of alternate proposals.

post-audits, and in a remarkably high percentage of cases its forecasts are accurate.

IV. Discounted Cash Flow Method

Of the four methods this is the most sophisticated, and the most controversial. The principle on which it works can be applied two ways. Both take into account the fact that a dollar you have in hand today is worth more than a dollar that you expect to get in some future year. *Reason:* the dollar you have today will earn interest; not so the dollar you expect to get in the future.

FIGURE 4. CASH FLOW METHOD

Machine costing $2200. Anticipated life 5 years. No salvage value.

Year	Gross Earnings of Machine before Depreciation	Present value of earnings*, discounted at rate shown: 18%	20%	22%
1	$ 200	$184	$182	$180
2	600	458	446	432
3	800	510	486	462
4	1200	640	596	556
5	1200	534	488	448
Totals	$4000	$2326	$2198	$2078

*These are table values, not percentages of earnings.

Fig. 4—CASH Flow Computation.

A discounted cash flow computation starts with the usual estimate of the operating income from the equipment. (You can use lines 1 to 29 of MAPI form to get this figure.) You estimate this income for each year of the service life of the investment, making no allowance for depreciation. Then each of these annual returns is discounted, like a series of notes presented to a banker. You can pick an arbitrary rate, as the amount of return your company wants. Figure 4 shows discounting at three rates, 18, 20, and 22 percent. This shows that the machine in question will give a return of better than 18 percent, and also pay for itself with a little left over. It will provide a return of 20 percent, and just pay for itself. If you want a return of 22 percent, this equipment won't meet your standard. (These discounted amounts are taken from a regular discount table. In practice only one of the three columns would be shown.)

This method has the advantage of including, automatically, exact factors which you choose for several variable–amortization, (capital replenishment, return of capital consumed), for obsolescence, and for variations which you can foresee in the yearly earnings of the equipment. You put these factors in when you estimate earnings for each year, and when you choose the discount rate. This choice also can conform to the capital costs of your company. While the MAPI System allows for all of these variables, they are in "frozen" form, and not precisely adjusted to your needs.

The variant of the discounted case flow computation is called the "interest-rate-of-return" method. To

calculate this you find an interest rate which is just large enough so that, if it is charged each year against the unamortized part of the cost of the equipment, the earnings less this interest will exactly pay for the equipment over its service life. (Salvage value is considered, and the interest begins with the first outlay for equipment, before the machinery begins to produce earnings.) Figure 5 shows this graphically. The equipment or system which requires the highest rate to produce this balance is the best buy.

Both the discounted cash flow method and its variant are subject to the criticism leveled against return on investment computations—the results can be poor if the computations are not skillfully handled. These methods also have the disadvantage of being hard to explain.

Which Method To Use

You may have a choice. Of the four, the MAPI and cash flow methods are most likely to yield reliable results. You may prefer MAPI, as the easiest to explain.

Chances are that you will have to talke to management in terms familiar to them. If that is so, it is probably need to use *payoff period* figures to convince operating management, *return on investment* as the means of interesting top management, because they usually think in these terms. If this is true in your company, then the more refined methods are useful to you mainly as a private check on your own recommendations.

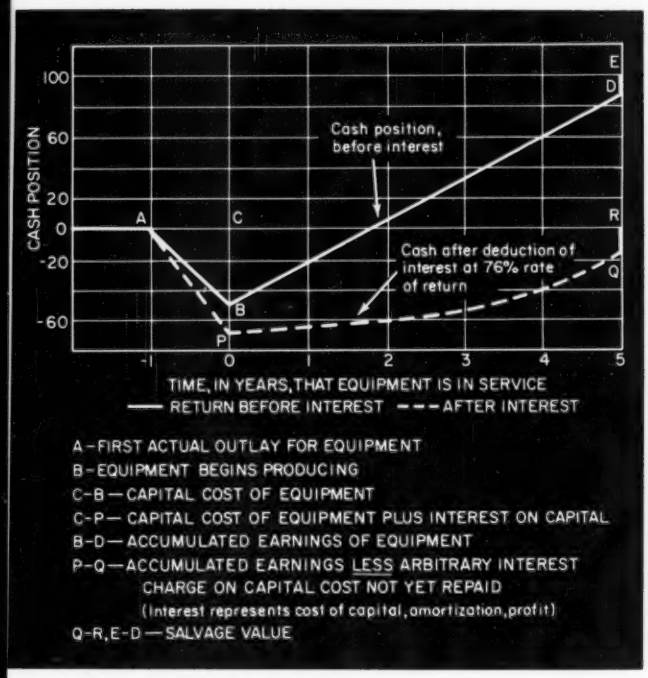


Fig. 5—INTEREST RATE of Return.

Presenting the Data

Getting management to accept the right mechanization program is the next part of the job. You will have to plan your persuasion skillfully, or all your effort in planning, getting prices, and figuring costs will be wasted. Here are some suggestions:

1. **Find out, if you can, what basis your management uses for equipment investment decisions.** Present your ideas in the terms they use. But be honest—make your own decision on the basis of computations you consider correct.
2. **Plan your presentation, regardless of the size of your audience.** If you must show your work to one man, who will then transmit it to those higher up, give him a package he can use for his presentation.
3. **Have a written report, but don't give it out until you have finished your oral explanation.** (You don't want your audience thumbing through pages, and ignoring what you say.)
4. **Start your presentation with benefits.** Tell, very briefly but as dramatically as possible, what advantages the proposal will produce.
5. **Cite precedents.** Find, if you can, another company, or another division of your own company, successfully using a program similar to yours.
6. **After explaining benefits, organize the balance of your presentation logically—problem, solution, summary.** Mention alternate solutions only very briefly.
7. **Avoid emphasis on alternative proposals.** Be positive about the benefits of the one proposal you favor. (Details of alternates can be handled in discussion. In a written report put alternates in an appendix.)
8. **Make your explanation simple.** Avoid technical jargon.
9. **Use visual aids.** If your audience is 3 or less, hand out sheets showing charts, tables, drawings, pictures. For larger audiences consider such aids as flip charts, flannel boards, slides, visual-cast devices, blackboards, models, samples. Remember, even with the small audience show only one thing at a time.
10. **Summarize, and make a positive recommendation at the end of your presentation.** Ask for the order!
11. **Be ready with supporting data, discussion of alternatives, etc., in case you are asked questions.** To help anticipate your needs, try out your presentation on some of your associates who are primed to play the role of management critically.
12. **If an intermediate boss wants to grab credit for the work, let him.** This is better than letting his tactic stop you; he will ultimately be found out.
13. **Don't let pride of authorship make you stubborn about details.** Compromise on nonessentials.
15. **Don't let any of your listeners give a final NO.** Maneuver to get postponement or revision, if the decision is going against your proposal.
16. **Keep the idea alive even if it seems tabled.** If your report gathers dust on the boss's desk, think up amendments and take them to him, to get the matter back into his mind. ♦

For Further Reading

Business Investment Policy, by George Terborgh, Machinery and Allied Products Institute, Washington, D.C.

Measuring the Productivity of Capital, Joel Dean, Harvard Business Review, January, 1954

HANDLING— assembly's twin brother

YOU NO MORE PLAN ASSEMBLY without deep consideration of material handling than you build a car without wheels. You must plan how to get material to assembly, what to do with it between stations, and how fast to move it. Otherwise, you face burial beneath an avalanche of formed or partly-formed parts.

Consider bins, hoppers, racks, transfer machines, bulk feeders, parts orienters, positioners, conveyors, carts, and others—along with the machines and workers who do your assembling. In other words, consider the entire assembly operation. For this discussion, let's look at assembly in two ways:

1—*An assembly system* **allows for independent rates for each operating station.**

2—*Automatic assembly machines* **provide a rigid sequence of steps.**

Both were discussed at the 1961 National Automobile Week, sponsored by the Society of Automotive Engineers Inc.—the first by Don A. Cargill, president of Cargill, Detroit Corp., Clawson, Mich.; the second, my Lyell C. Tullis, chief engineer, Gilman Engineering and Manufacturing Co., Janesville, Wisconsin.

ASSEMBLY SYSTEM

DON A. CARGILL

I say good assembly planning results in a smoothly functioning lowcost system for getting out the work.

HOW FAR TO GO

When to use fully automatic assembly machines . . .

. . . Long product model life.

. . . Straightforward operations, few variations.

. . . Parts with rigid tolerances, extremely few out-of-tolerance parts.

. . . No selective assembly involved.

. . . Due date for the machine to start producing not essential to production of the item.

(You may have to use workers and a semiautomatic assembly machine if you must be somewhat selective in assembly or must reduce development engineering time to meet a definite due date).

When to use an assembly system . . .

. . . Products take a wide range of probable actions.

. . . Cycle times NOT constant for individual operations.

. . . Changes of run, due to product mix, product derivatives, and batch lots of supplies.

. . . Continual adjustment operations, shut down frequently for supply, dressing, or maintenance.

. . . Regular product or process changes.

. . . No time for machine development program because of production due date.

. . . Production high but capital budget low.

Don A. Cargill

The constant object is to systemize. Smooth-functioning assembly does not mean automatic assembly machines, automation, or mechanization of work formerly done by operators. It's more. It encompasses all the operations on the product.

There should be a good deal of automatic material handling between operations. It will transfer parts, orient them, and position them.

Another necessity is production protection. You should be able to interrupt the flow at any station without closing down the whole line. You do it with automatic storage floats, conveyors, or machines.

An assembly system has to do these things:

1—Handle the material automatically.

2—Orient and position the parts.

3—Protect production by permitting independent rates for each operating station, if necessary.

These items do NOT constitute assembly systems: a long assembly conveyor that paces operations, an indexing fixtured chain, a fully automatic assembly machine, an index table.

Planning the System

Complete planning for assembly should cover everything—methods and processes of assembly, environment, workers, and all the other things, such as material handling.

I find engineers often think in terms of black and white what they wish to happen in specific operations under controlled conditions. So, their idea of planning is to list the needs for layout, methods, processes, personnel, equipment, and tooling. But this is not a plan.

A plan should go far beyond a list, should include allowances for the unusual. A list is inadequate because of the things that don't work as listed. There's a wide range of breakdowns, slowdowns, and quality variations.

Some Planning Advice

Mechanization of assembly can do good things, such as reduce cost, provide uniform quality. But, complete equipment planning for assembly does not mean complete mechanization.

Too often, fully automatic assembly seems to be a goal in itself. We say we want a project automated. The project or tooling engineers try to do so. What comes out is a project described by a list of automatic functions. But a solution in this manner may create serious difficulties.

Assembly planning should be done by systems-conscious men. And they should plan for equipment that accommodates the range of probable actions that can take place at each operation.

(On the opposite page, Don A. Cargill gives you a rule-of-thumb outline for making a decision on which type of assembly is better for you. Keep them in mind as you read Lyell C. Tullis' explanation of automatic assembly machines.)

AUTOMATIC ASSEMBLY MACHINES

LYELL C. TULLIS

Their purpose: save labor and so reduce product cost. They may also be safer and improve quality.

To limit my discussion, I'll deal with medium-size assemblies, roughly 6-inch cube or less, but larger than miniaturized. Many medium-size assemblies lend themselves to high volume, justify the effort and cost of full mechanization. I'm discussing output ranges of 300 to 400 an hour up to 4,000 to 5,000 an hour.

Crude But Necessary Step

To plan automatic assembly, count the number of steps you'll need. Estimate the cost of a machine that performs these steps. Compare the labor savings you expect with maximum amortization of the machine.

You'll probably have to base some estimates on experience with similar machines, adjusting roughly for number and size of parts in the new one. Don't be surprised if you're pretty far off. But it's better to have an estimate now, before getting into detailed plans, than after you've gone too far to stop.

If a Machine Is Feasible . . .

Study each step in the assembly and list the ways you can handle parts. That is, can they be hoppered? Made at the machine? Must you handle them manually because they're fragile? Add to the list what the machine will need for lubrication, for inspection, for parts positioning.

When you've studied everything you can think of, try for a complete plan. You should produce a picture like one of these:

- Entirely automatic assembly in straight line sequential operations.
- Manual loading of a difficult part, with automatic assembly from then on.
- Automatic assembly, finished by a manual operation, such as inspection and manual unloading.
- Preliminary automatic operations, followed by manual handling, followed by automatic completion.

Laying Out the Machine

Because your product probably will be held by fixtures, circulate them intelligently. Commonest layout is over and under, a straight line with fixtures holding parts on top and empty fixtures returning underneath.

But I've found a horizontal fixture arrangement is superior in medium size assembly.

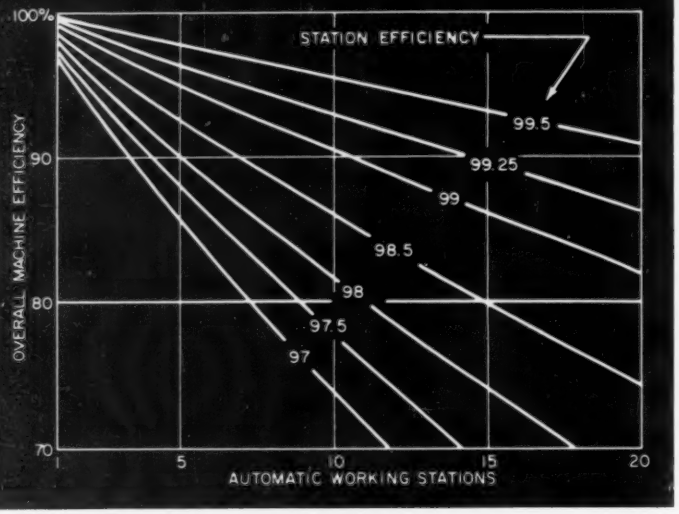


Fig. 1—For a 10-station machine, you need an average of nearly 98 percent reliability for each station just to keep overall machine performance at 80 percent efficiency. To bring the overall machine up to 90 percent, you need 99 percent station reliability.

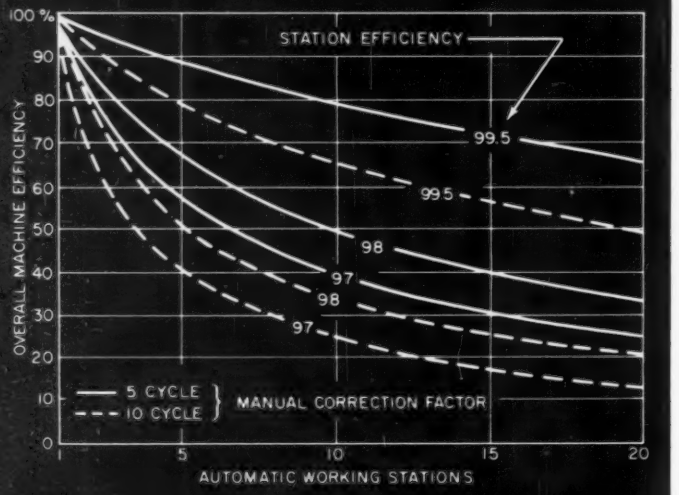


Fig. 2—This machine automatically stops when it senses a defective part. Overall machine efficiencies drop quickly when it takes 10 cycles to correct the error as compared with five cycles. Just to get the 80-percent efficiency of the overall machine in a 10-station arrangement, you need 99.5 percent average station reliability. This is for corrections that take only five cycles. For those that take 10 cycles, your station reliability of 99.5 percent will give you overall machine efficiency of only 66 percent.

Main difficulty with over and under: the return flow of fixtures obstructs work on the underside of the full fixtures. With the horizontal system, you can work on top, either side, or bottom of any fixture.

Combining manual handling with an over and under may call for a longer machine. For each manual station you have to add two fixtures, one above and the other beneath. In the horizontal, you don't have to add.

A free fixture is easier to use in a horizontal machine circuit.

There are several other considerations. You can put in manual operations so long as you leave sufficient distance between stations. You probably will need safety switches to protect the worker in case of machine failure.

Leave plenty of room for hoppers and other parts handling equipment. Even for a medium-size assembly, this space may be many times that of the machine. Plan this early or face the difficulties induced by odd-shaped feeders all over the place.

Control the Quality

Provide a means for the machine to watch its own motions and to inspect its product. This cuts down on scrap, rejects. Make the machine protect itself from damage caused by faulty parts and foreign material. Use mechanically-controlled movement as much as possible. Get high-quality workers to run these complex machines.

Fixtures may be costly. If your assembly has a base like a fixture, consider handling it with transfer fingers or some other simplified way. You may save as much as 10 percent of the machine cost by doing away with fixtures.

The Vital Production Proving

This is an important cost of the total machine. Run a large number of samples through all sets of tooling to overcome difficulties with burrs and foreign material. Also, remember that the material handling elements are the arteries of the machine and must work right with all machine changes.

During production proving, consider where design changes might aid assembly, particularly in improving reliability of the material handling, parts feeding, and hoppering. These must approach nearly 100 percent efficiency if the overall machine efficiency is to hit 80 percent, the usual minimum acceptable level.

Notice in Fig. 1 how high the average efficiency of each station must be to get an acceptable overall machine efficiency. Notice too how the efficiency of individual stations must rise, as you add stations, just to keep the overall machine efficiency at an acceptable rate.

Fig. 1 is for a machine which detects a defective assembly, records it in a memory system, and diverts the assembly at unloading. But the machine continues to run. Fig. 2 is for a machine that stops when it detects a defective assembly. Then the worker corrects the defect. Notice how fast the efficiency drops.

You're justified in going to intermittent cycling machines when your volume exceeds 300 to 500 an hour. They work well up to 1,800 to 2,000 items an hour for single-tooled machines. Double tooling nearly doubles these rates, not quite because efficiency falls off slightly.

When your volume exceeds 5,000 to 10,000 an hour, you'll need a multiple machine with continual flow, if you can design it. ♦

For more information on this subject, be sure to read Evaluation of Work Station Layout, which will appear in the June issue of MHE.

Always before, this material had to be blasted. Then they bought a Michigan Tractor Shovel. It ended the trouble and

SAVED $34,000 per year

Ability of their Michigan Tractor Shovel to dig a material which always before had to be blasted is saving an estimated $34,000 per year for Davison Chemical Co, Bartow, Florida.

Together with its digging power, the Michigan also has proved mobile enough to work quickly in the same tight quarters as the smaller loaders it replaced.

The material being handled is triple super-phosphate—manufactured, stored and cured at this plant for at least four weeks. The Michigan is a Model 85A, 9000 lb lift capacity equipped with 1¾ yd bucket and replaceable bucket teeth. Its savings have been fourfold . . .

ONE, because the 96 hp Michigan can effectively load the hard-set TSP, Davison has eliminated all blasting.

TWO, the plant has traded in one of the two ⅞ yd tractor shovels previously used to handle the blasted material, moved the second to another job. This transfer has resulted in substantial savings due to the Michigan's lower maintenance cost and greater capacity.

THREE, no less than *12 men* (on a 3-shift basis) *have been transferred to other jobs* . . . 3 tractor shovel operators, 6 drillers, 3 dynamite handlers.

FOUR, with the elimination of blasting has come the elimination also of building repairs. No more are holes blown in the sides and top of the 25,000 ton capacity curing and storage shed.

40 to 45 loads moved hourly

Photo above shows typical operation. Like most loads, this one totals about 1¾ cu yds, 1800 to 2000 lbs. In seconds, the Michigan will turn, drive 25 to 150 ft, and feed the crusher hopper. Output, loaded by hopper conveyor into railcars, averages 40 to 45 Michigan bucket loads, 36 to 45 tons per hour.

Circle **19** on Reader Service Card

Try Michigan on your job

Michigans, of course, can't *always* eliminate blasting. But they do have almost unbelievable breakout force (plus maneuverability, plus unexcelled dependability). We'll be glad to give you the proof of a demonstration. Seven 4-wheel-drive, two 2-wheel-drive models to choose from.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

2445 Pipestone Road
Benton Harbor 26, Michigan

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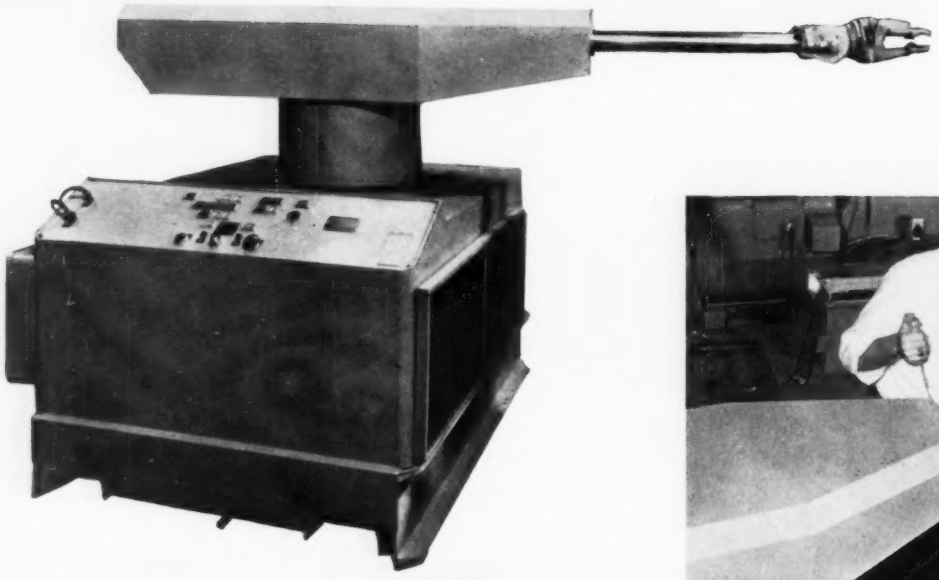
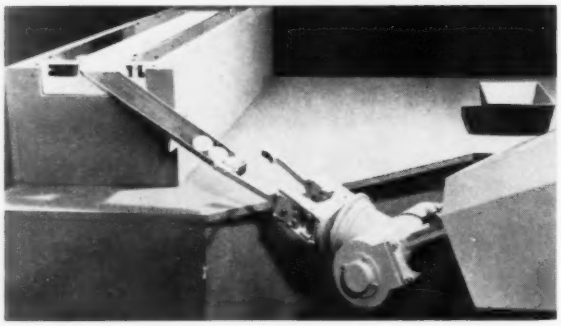




UNIMATE'S HAND easily can be changed to fit a job. All you do is remove two screws. These long, slender fingers do delicate work. You can get, among others, broad grippers for heavy steel cylinders, double-action, parallel jaws for bulky items, and special grippers to aid with swivel-action wrist.

Consolidated Controls, Division of Consolidated Diesel Electric Corp.

PROJECT ENGINEER Maurice J. Dunne shows how easy it is to teach Unimate a task. He prods the hand to the proper position by pressing the white buttons on the temporary teaching control attached to the hand. He records the end of each movement by pushing the button held in his right hand.

A shape of things to come?

IN A PREVIOUS ARTICLE in this issue *(Evaluating and Planning a Mechanization Program)*, we suggested that machine design not try to duplicate the motions of hands. Now, we have a machine that duplicates human motions—but faster, surer, and cheaper. It's ideal for transferring material, loading presses, forges or lathes, tightening nuts and screws, spot welding, and automatic paint spraying.

It's Unimate, a robot that looks like a gun turret with an arm instead of cannon barrel. It learns complicated tasks in one lesson, repeats them accurately until stopped or taught a new routine.

Most automatic machinery can do only one job, says a manufacturer's spokesman. "Changes in products often make the machine obsolete before it pays for itself," he continues. "Unimate avoids obsolescence. Like a worker, it can learn another job. Through continuous use, not necessarily on a single job, this machine can pay for itself in two to three years and still have many years of useful life."

Unimate at Work

Our Eastern editor, Henry Lefer, watched Unimate do its stuff. He reports:

> The foreman took Unimate's hand, gently led it through the motions. Together they picked up a metal billet from a conveyor, placed the billet in the die of a hydraulic press, turned it over into a second-stage die, then placed the finished piece in a tote box. "Well done,"

Continued on page 64

Bendix announces

TWO

GREAT NEW COMPONENTS FOR ZENITH LP FUEL SYSTEMS

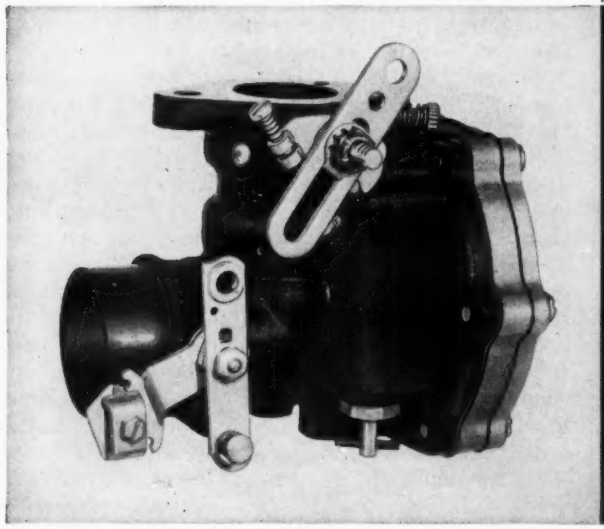
1 ZENITH PRESSURE CARBURETOR

Greater safety and efficiency in fuel control are built into this new Zenith® LP carburetor. In its development, our engineers drew upon their wide experience in other fields of carburetion—particularly aircraft pressure carburetion, where Bendix patents exist. The new LP models offer many advanced features: Both fuel economizer and final regulator are built in. The carburetors are fully balanced, can have fixed or adjustable fuel metering, and are simple to service. Two sizes available: 1″ S.A.E. (Model PC 1-8) and 1¼″ S.A.E. (Model PC 1-10).

Zenith Supplies more LP Gas Carburetors for Materials Handling Original Equipment than any other Manufacturer.

2 ZENITH HOSE LINE UNIVERSAL VAPORIZER

As the high-performance companion to the new pressure carburetor, we have designed a new hose line vaporizer. It mounts in any position in upper or lower radiator hose. For additional capacity on large engines, vaporizers can be mounted in both hoses. The unit, including the head, is cast from aluminum for light weight. The casting includes a pad for bracket or brace support in mounting.



Write for information on Zenith's LP Gas Carburetor School

Zenith Carburetor Division

THE Bendix CORPORATION

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- Hold 0° temperatures.
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- One man operation.
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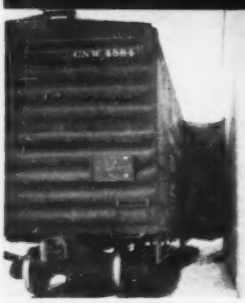

CAR-DOX
Extendable
RAIL DOCK
SHELTERS

Circle 53 on Reader Service Card

said the foreman, and pressed a button. Unimate then did the job alone, over and over, each time exactly as before. Hour after hour, Unimate went on, faster than a worker and without coffee breaks, lunch, or backtalk. Just before the night shift, the foreman carried Unimate by fork truck to another job, showed it how to pack parts in cartons. After the runthrough, Unimate took over, tireless, steady, accurate, still plugging away long after the foreman went home.

The Physical Motions

A hydraulically-worked arm telescopes from 3 to 7 ft. in length. Horizontally, it sweeps a 220° arc; vertically, 60°. With arm fully extended, Unimate reaches from within 4 inches of the floor to 90 inches above. It grasps items in a swept volume of 350 cu. ft.

Unimate's arm ends in a wrist that bends and rotates. Air pressure controls a pneumatically-operated claw attached to the wrist. Unimate handles successfully anything from eggs to steel blocks. Its capacities: 25-lb. items at full speed, and up to 75-lb. items at slower speeds, but all quicker than a man.

How It Works

The 350-cu.-ft. working volume divides into cubes 0.050 inches on a side. Unimate can make five movements: swing around, in and out, up and down. A hydraulic actuator mechanically linked to an encoder controls each degree of movement. For every position of the actuator, there's a corresponding position of an encoder.

The foreman presses a "record" button. He moves the arm to a position, at the same time (because of the linkage) impressing the encoder disc. The position goes into the system as digital information bits on a nonrotating memory drum, defining the location of the arm. This can be repeated to form a complete sequence, up to 200 individual steps (drum capacity).

Unimate's brain is a logic system with a comparator. After the lesson, the foreman pushes the operate button. The comparator compares instructions from the magnetic drum with actual positions of encoder discs. The comparator directs the actuators to move, erasing the difference. When the error between drum signal and encoder position is large, the actuators move fast. But they slow down when approaching the desired position to prevent overshooting and sudden shock.

Magnetic instructions are easily erased and a new sequence taught. New steps may be substituted by simple replacement. But to add an extra step, you must erase and reteach the entire following sequence. tor. After the lesson, the foreman pushes the operate

Some Unimate details: Minimum dimensions, 5′ x 4′ x 4½′ high. Weight, 2700 lb. Positioning accuracy, ±0.050 in. each dimension. Maximum load 25 lb. at normal speed, 75 lb. at slower speeds. Memory capacity, 200 sequential commands. Clamping force, up to 180 lb. at end of 4″ fingers. Design life, 40,000 operating hours.

The manufacturer has a group of Unimates going through pilot runs in selected industries for further seasoning. The price tag is $25,000. ♦

Foot throttle-controlled lift and tilt.

Seat hinges back for easy side or overhead battery removal.

Drive wheel and motor accessible for servicing.

NEW compact electric truck by AUTOMATIC®

- ★ **Works in congested areas with ease.**
- ★ **Gives you speed where it counts—in traveling and stacking.**
- ★ **Maximum accessibility for easy servicing.**
- ★ **Adjustable foam rubber ventilated seat for extra driving comfort.**
- ★ **Class H Silicone insulated motors exclusive with AUTOMATIC.**
- ★ **Capacities 2000, 2500 and 3000 lbs.**

Here's a new counterbalanced truck that can speed up handling of goods in narrow aisles, trailer trucks and on crowded docks. The model RST is ideally suited for warehouse operations, light industry, and retail supermarket handling. Pallet loads of groceries can be moved directly into the store. Compact design, short turning radius and good weight distribution make an outstanding unit for working inside trailer trucks or in buildings with limited floor capacities. Even the price is compact! Get the details—mail coupon.

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Send For Literature

☐ Please send specifications on new compact electric truck, Model RST.

☐ Please send "Handbook of Cost-Cutting Materials Handling Ideas."

☐ Please have representative call me for appointment.

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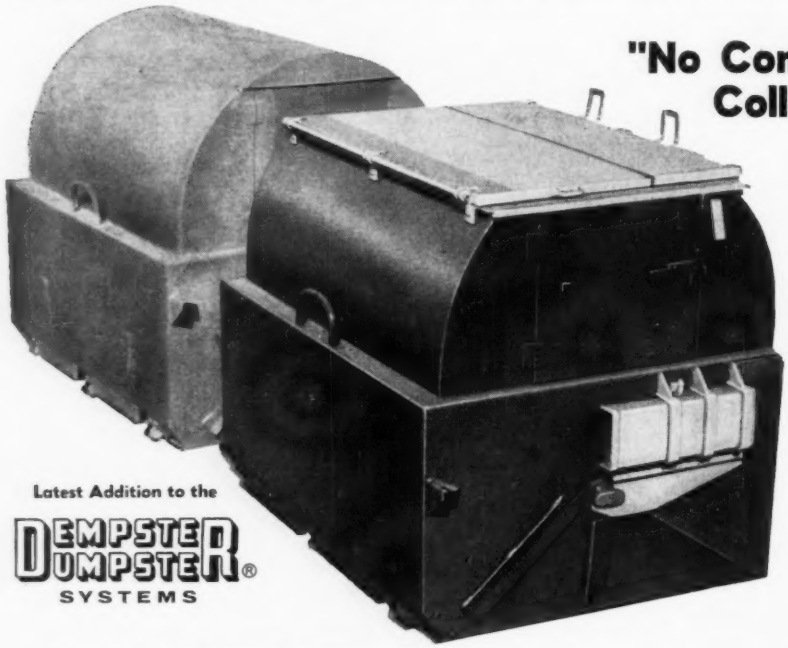
New SUPER DUMPMASTER Handles Converted DUMPSTER Containers...Beats Long-Haul Problem



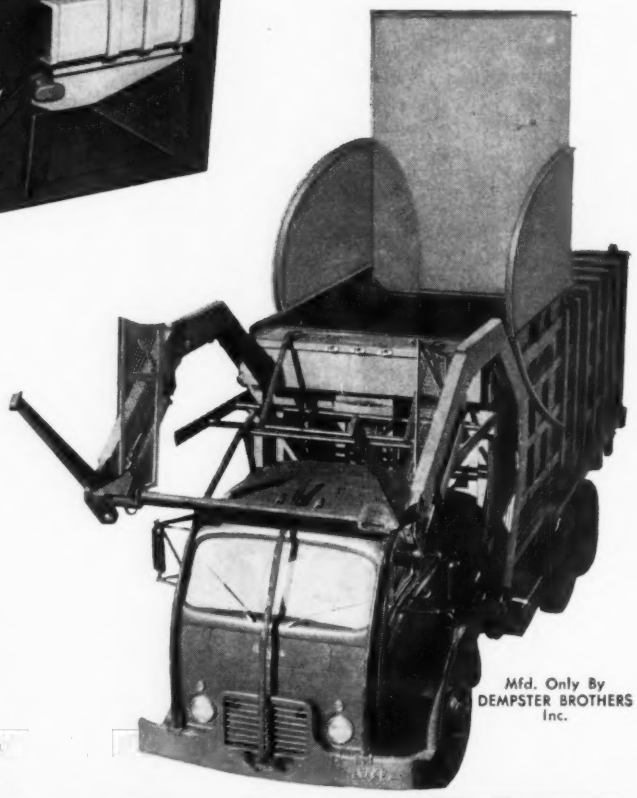
Latest Addition to the DEMPSTER DUMPSTER® SYSTEMS

"No Container Haul System" Collects Refuse on Spot

If longer trips to disposal areas have raised your operating costs, a small investment in conversion kits protects large investments in DUMPSTER containers. The Super DUMPMASTER handles converted DUMPSTER containers up to 12 cu. yd. and all DUMPMASTER containers one thru 12 cu. yd.

Owners of DEMPSTER-DUMPSTER Systems who now face long haul problems due to movement of disposal areas may now convert from their present "container haul" system to the new SUPER DUMPMASTER "no-container-haul" system without abandoning their investment in DUMPSTER Containers.

The SUPER DUMPMASTER makes its rounds to each converted container, mechanically empties the contents into its 30 cu. yd. packer body and compacts the material to a fraction of its former volume with the 85,000 lb. force of its packer plate. Rather than haul each container to the disposal area, the SUPER DUMPMASTER carries the contents of many containers on each trip, cutting collection costs drastically.



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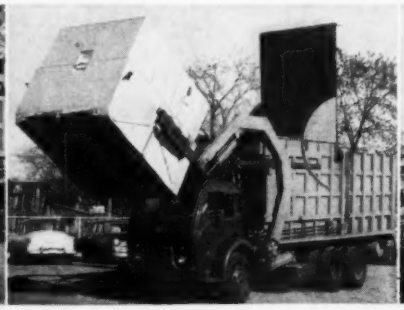
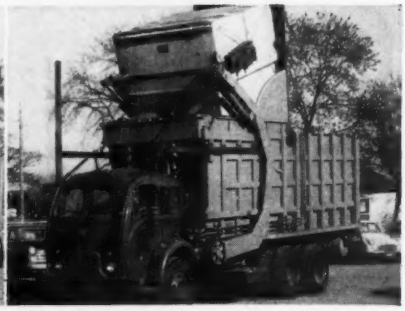
The SUPER DUMPMASTER engages container.

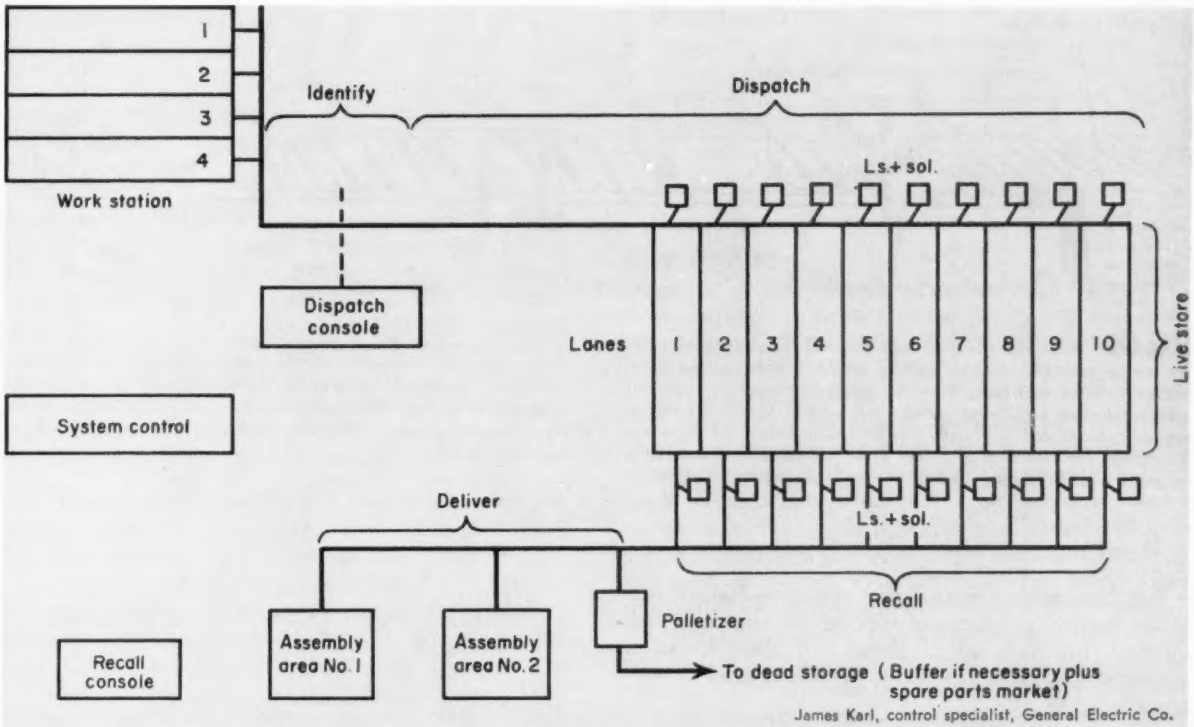


Clearance arms carry it toward hopper opening.



Container is rotated, emptying contents into the compaction body.

Circle 37 on Reader Service Card



James Karl, control specialist, General Electric Co.

AUTOMATIC CONTROL OF FUNCTIONS IN A TYPICAL MANUFACTURING INSTALLATION:

DISPATCH CONSOLE—Pushbutton console with manual identify of items emerging from work stations 1-4.

LIMIT SWITCHES AND SOLENOIDS—Limit switches for counting in and out, jam and shortage sensing. Solenoids for operation of lane diverters and release gates.

RECALL CONSOLE—Punch card operated from orders from assembly areas. Alternate manual address for delivery to storage area.

SYSTEM CONTROL—Shift register control memory for dispatch, recall control circuitry, delivery area dispatch, simple computation of live storage inventory (print out on demand) plus power supplies, and supporting auxiliaries for system control.

IDENTIFY FUNCTION—Manual by visual inspection by operator. Entered into control by pushbutton.

DISPATCH FUNCTION—Control memory, static shift register type.

STORE FUNCTION—Store by type, with inventory signals available.

RECALL FUNCTION—Synchronized random recall working from punch card shop orders for assembly areas. Static shift register type.

DELIVER FUNCTION—Similar to dispatch. Control memory shift register working from delivery zone instructions on job order cards.

WORK STATIONS 1-4—Duplicate work stations capable of production of any 10 subassemblies.

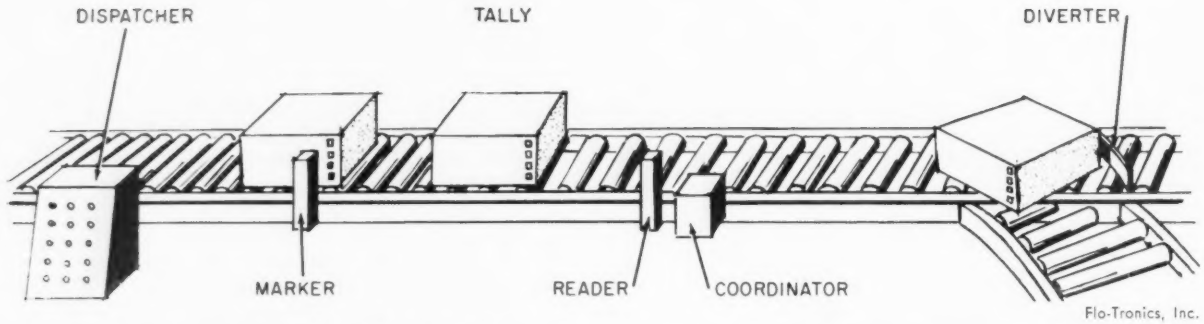
Control in-process flow AUTOMATICALLY

CONTROL—a small word with a big future.

Make no mistake, you'll need to know this word, what it stands for, and how it affects material handling. You'll have to learn how to make skillful use of this newest tool in your material handling kit if you want to qualify for material flow management. And the manufacturing section of your plant is one place where you can use this tool often and vigorously, and never dull its edge.

Look at it this way. Material flow control of any type is one of the main sources of savings in manufacturing. With *automatic* material flow control, the opportunities for new sources of savings increase in many directions. Savings are inherent in each of these steps:

- **Control the feeding of material to a manufacturing operation.**
- **Control the operation itself.**
- **Control the flow of information from the operation and use it as feedback to regulate both the operation and its feeding.**



Flo-Tronics, Inc.

DIAGRAM shows identification and dispatch function being performed by magnetic conveyor control. DISPATCHER provides information (station addresses, identities, etc.) by means of operator with pushbutton console or punch card system. MARKER contains magnetic heads which record the information received from the dispatcher. The marker then places a set of coded directions on a magnetic TALLY located on the tote pan passing by. A READER at each station on the conveyor contains a set of magnetic heads which scan the information on the tally. A COORDINATOR compares the information received by the reader with the code it has been set to accept. The coordinator provides the necessary control signal to activate the DIVERTER, which shunts the tote pan off the main conveyor line.

Put these steps together and you have formed one of the basic closed loops of continuous automatic production. Integrate all of these individual loops in manufacturing and a positive, flexible control of material is yours.

Planning Steps

Where's the starting point for automatically controlled production flow? Long-range planning is the answer. Because of the complexity of a completely automatic production flow system, you'll need to apply the systems approach to the limit. You'll need to know how fully developed the system will be in 1965, where it will stand two years from now, and what you can install tomorrow. Warning: Plan for the future, but don't wait for still-undeveloped hardware before plunging into the automatic control stream. The experience you get from automatic control today will put you a jump ahead of your competitors when a more sophisticated system comes on the market five years from now.

The first planning step is an analysis of your manufacturing operation. (This analysis, in practice, includes factors such as receiving, storing, shipping, and warehousing; but because in-process handling is the theme of this Guide Issue, we will cover only the manufacturing function here.) The basic rule behind the analysis is: You can't set up automatic control of unknown functions.

Analyze the need for the product. What output is necessary now and in the future? What is your product mix?—how much design variety do you need at all times? What new needs will make your present product flow too slow, and force you into highspeed automatic moving of material?

Analyze product design. Does it need design simplification so that it will lend itself to automatic control of assembly? Will an automatically controlled handling system become the basis of automatic inspection procedures, thus improving product quality? Learn from the manufacturing engineers how tooling, processes, and production affect product flow. Can product redesign open up new handling techniques that will fit into the automatic control pattern?

Analyze the manufacturing layout. Is there enough room for operations to be performed efficiently? Study flow of material between operations. Make sure that every unnecessary handling has been eliminated . . . every needless backtracking cut out . . . every variable identified and predicted.

Analyze your manpower needs. How much direct and indirect labor is used in the manufacturing operation? How many people are engaged in manufacturing and how many in material handling? Examine the output of both activities; find out what systems compromises have been made to accommodate lack of competent people.

Analyze information flow. Will a change to automatic control enable you to feed back information that will cut inventory? How far will automatic control of product flow information go towards providing management with an instant representation of the company's standing? Will the system you're studying to control product flow in the plant be compatible with the information handling system already installed in the office? Or will you be starting from scratch both places, thus making it easier to use the systems approach?

Methods of Approach

The design and installation of a continuous automatic production flow system will involve you in some new relationships, both in your company and with suppliers. You'll be working side-by-side with marketing men, purchasing agents, methods and procedures people, manufacturing engineers—everyone who has a stake in the benefits of the system.

A company can take various approaches to the mechanics of designing and installing the system:

1. The company can use its marketing, accounting, and engineering manpower to evaluate product need and design. Company uses its own engineers to design the system, then purchases the hardware piecemeal. Advantages: The people doing the evaluating and designing know the product and the problems surrounding it. Disadvantages: These same people can be so close to the product, and the way it's made and handled, that they can't take an objective viewpoint towards improvements. Also, there is danger of losing reliability with do-it-yourself specifying of control equipment. You may be burdening yourself with solving some of the same control problems that manufacturers' engineers have already licked. Remember, malfunctions have a far-reaching effect.

2. The company can call in a consultant to do the market study, product design evaluation, and handling system design. A good consultant can provide the objectivity you need. Your main concern is that he has sufficient experience in automatic material flow control so that he can do a professional job in this area. Willingness to tackle the project isn't enough. He must have the right kind of background to go with it (see Exposing the Phony Consultant, MHE, March 1961).

3. The company can contract for "turnkey operation" with a manufacturer. This means that the manufacturer will provide complete design, installation, and performance guarantee for the user. Manufacturer's experience with designing systems for your type of product is a factor that weighs heavily here. Since you will be relying on his performance guarantee, his general reputation in the field is important too (see Buyers' Guide to the Equipment Jungle, MHE, Feb. 1961).

Control Functions

Flow of material in production must be approached from the viewpoint of the functions which can be controlled. To provide automatic control over discreet items moving through production, you will be concerned mostly with:

Identifying the item
Dispatching the item

Each of these automatic control functions has subfunctions, plus special hardware for implementation.

Other functions which are less often a part of the manufacturing operation: storing, recalling, and delivering. (Diagram on page 67 shows how a hypothetical manufacturing installation might use all the functions of automatic control.)

Identifying

An item moving through production flow must have some identifying characteristic as part of itself, or attached to itself, or attached to its container, that can be interpreted by automatic reading devices. Some identifying methods now being used are:

- Mechanical or photoelectric limit switches that measure size
- Mechanical or load cell devices to record weight
- Readers that interpret binary code markings on boxes
- Magnetic reader heads that identify magnetic tapes
- Fingers or dogs that protrude from carriers and activate limit switches for diverting.
- Electronic-optical head that identifies product color for industries that have to sort or inspect by color
- X-rays that read metallic compounds in tapes

Dispatching

Next step after identifying a product automatically is to dispatch it automatically. There are two main control techniques for dispatching: item memory and control memory.

Item memory carries the identification with the item dispatched on, say, an overhead or roller conveyor system. Stations along the way question the identity of each part as it passes. The item may have been coded before it was placed on the conveyor; all the decoder has to do is read it and operate the diverter. Sometimes the item is not identified before it is placed on the conveyor. Then it is the reader's job to identify the item and dispatch it in one operation.

Control memory puts the identification into a control system that is an electric analogy of the conveyor system. There are two methods of carrying this out: (1) remembering the *sequence* of items without regard to item spacing, or (2) remembering the *position* of each item on the conveyor.

Sequence memory generally uses a storage type shift register—a group of relays, stepping switches, or static logic elements that are arranged to provide for the sequential transfer of information placed in one device, section, bank, or group of devices to the next.

Position memory uses a simultaneous shift register —devices that can be synchronized with the conveyor and marked, such as mechanical pinwheels or disks, magnetic drums, disks, or tapes, or paper punch tapes.

Benefits

Although automatic control of production flow is associated with savings resulting from lower manpower requirements, there are other advantages of greater importance.

- Highspeed flow of information allows you to use advanced inventory control techniques.
- Automatic product flow control systems tie into data processing systems and make them more versatile and useful.
- Material control systems support automatic quality control techniques and provide for automatic feedback of test results to production.
- Automatic product flow control permits you to increase output without adding new manufacturing space. ♦

You'll find details of planning for automatic handling in other articles in this issue: Evaluating and Planning a Mechanization Program, page 51; How To Count Your Profits before They Hatch, page 54.

Equipment design battle: MANUFACTURER VS. YOU

"WHY DON'T MANUFACTURERS design equipment I can use? you ask. "You want the impossible at no extra cost," retorts the manufacturer. And the battle is on!

Let's tune in on some charges and countercharges.

The user says:

. . . I always wish for some changes after I've had the equipment for a while . . . There ought to be more attachments for fork lift trucks . . . We need more standard sizes of conveyors . . . I only ask for a little change in your model. Why charge a fortune? . . .

The manufacturer says:

. . . You fellows don't buy quality, only price . . . You want free engineering; then you open the job to competitive bidding . . . You buy gimmicks instead of what you really need . . . You want specials turned out as quickly as standard models . . . You think you know more about our equipment than our engineers . . .

Like the gallant troops they are, both sides give the other credit for some decency.

The user says:

. . . Basically, most material handling equipment is well made . . . I realize the manufacturer builds to suit the bulk of users . . . I have no difficulty getting specials, but they cost . . .

And the manufacturer returns the compliment:

. . . Many good ideas come from users, and some become standard components . . . Over the long pull our smart customers buy value and quality, not price . . . Good customers consider what the equipment will do for them, not just how much it costs . . .

A Flank Attack

The equipment design battle is not always between the user and manufacturer. You will find plenty of side skirmishes between the user and the company he works for.

The user knows what quality of equipment he needs, but often his company pushes price. The company may not come right out and order him to buy price. The company may even intone against being penny-wise and pound-foolish. But, in operation, it's often a different story. The user soon finds he saves hours of explanation and justification if he just authorizes the cheapest model.

Listen to this material handling supervisor. He works for a metals manufacturer.

"We buy the cheapest," he says. "To do this, we have to know lots of tricks. For example, we use a 6,000-lb. fork truck to handle 7,500-lb. loads by moving back the counterweight. Same idea with skids. We weld a couple of gussets underneath to overload them successfully. Nowadays you have to do this to save money." (The manufacturers answer this man when they have their say later on).

Reports From the Front

Let's find out some more user experiences on the equipment design battlefield.

A packing and handling engineer for an electric company recalls buying a $7,000 packaging machine, which didn't work. At the end of two years, modifications, repairs, and servicing doubled the cost and still it didn't work. The maker of the machine tried too. Then he sold out and the new owners tried to make the machine work.

"That was one stubborn machine," says the engineer. "It was a standard item, modified to take our box. But it jumped, skipped, never worked right. And all this time, of course, we were packaging without the efficiency the machine should have provided. I doubt whether we'll do any more business with this manufacturer. Nor will we buy another machine of this sort."

A handling man in a retail warehouse pleads for industrywide truck standardization. He says the gear shifts are all different and you never find the controls in the same place. Even the steering wheels are in different places. A driver hops off one truck onto another and has an entirely different machine to run.

"Another thing burns me up," he says, "I haven't seen a truck yet with decent emergency brakes. They all fail after the first six months. Also, I don't think

a manufacturer should sell a fork truck without a guard above the driver. But, believe me, you can buy them that way."

More News From the Foxholes

A handling man in a printing machinery plant feels many truck manufacturers fail to design trucks that are versatile enough. For example, he says a lot of trucks are really suitable mainly for warehouses with their straight aisles and adequate clearances. How about tortuous manufacturing operations?

But he agrees that quality is vital. He establishes what he needs to do the job, then buys the cheapest without sacrificing quality.

A handling engineer in a metals plant admits buying the cheapest conveyors. Then if they don't work just right, he has his men brace them here, shore them up there.

A warehousing man at a paint company yells for more truck attachments. He says he must design a lot of them for his particular needs. Also, he wants manufacturers to shorten trucks and turning radii.

Some Uniforms Do Fit

The equipment design battle doesn't bring everyone out to fight. A storage and receiving supervisor for a metals company orders special racks because there are no standards to hold his product. He reports no difficulties, nor exorbitant prices. But he recalls difficulties with a standard walkie lift truck. The one he bought had 6-inch-diameter wheels. The skids he uses have only 5½-inch clearance. The manufacturer merely put on 5-inch wheels—and that was that.

A material handling and packaging man in an automotive parts plant says he orders equipment changes mostly for convenience. He may ask for guards on lifts because he prefers them. And sometimes he wants seats 6 to 8 inches higher than normal, for driver comfort. These are easy to get, he says, and don't cost much.

A packaging man for an automotive manufacturer says equipment makers ought to keep a list of the changes sought by users and try to engineer in the feasible ones on new models. He found standard vibrators too large to count out his tiny screws. So the manufacturer made one ⅛ the standard size, charged about half the standard price. Now, says this user, the manufacturer is ready to make the smaller vibrator for the next man who comes along.

A packaging and shipping engineer for a large chemical company says his greatest need is information on what equipment is on the market and what it will do. For example, what can he expect of a fork truck in loading a rail car, what's the turning radius, etc.?

"I doubt if I didn't want something changed on any equipment I ever bought," he says. "I know the manufacturer is trying to suit most of the field. But he winds up suiting none when he compromises with equipment to serve many purposes. This kind doesn't do as well as a special. Nevertheless, I don't blame the manufacturer."

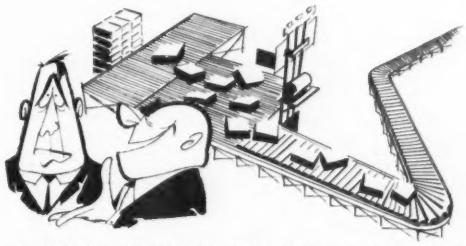
Report From Headquarters

We find all shades of opinion from troops on the line, the users. Some squawk, many are fairminded. But what about the manufacturers? They deserve their say.

"Since 1958," says a fork truck maker, "everyone's buying price. They expect everything at a discount. The purchasing agents play one manufacturer against another.

"There's little we can do about it. Sure, the truck manufacturers could come out with one price for comparable models. But then we'd all go to jail for price fixing. As it is, prices are close."

This manufacturer claims the size of the user's company plays a large part in the equipment design battle. He tells of a large firm that wanted to handle



IT DOESN'T WORK VERY WELL—BUT IT WAS CHEAP!

14,000-lb. loads but had only 4,000-lb trucks. To help them, he beefed up the trucks with heavier outriggers, additional rams, and heavier construction throughout. The user paid for this without complaining. He expected it. "But the smaller companies give us fits," says the manufacturer. "They squawk about specials and feel even the standard equipment costs too much."

This manufacturer says he often finds users don't really need specials, so he tries to talk them into buying standards. But they want gimmicks instead of what's useful. They want to play with levers and buttons. They don't understand that they can do the job faster and cheaper with a standard.

The Battle on High

A hoist and crane manufacturer tells about the user who seeks preliminary information, from perhaps, 45 manufacturers. Then he makes up a composite product from a dozen or so. He puts the design out for bids and finds the price higher than a standard item. It takes more engineering and new patterns to make exactly what he thinks he wants.

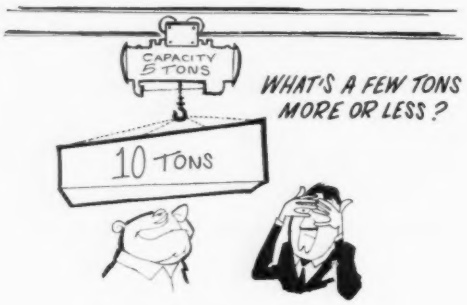
"For example," says the hoist manufacturer, "one user wanted us to make a hoist using his own control picked from his catalog. He was shocked at our price. We found we could save 15 percent just by using our standard model. So he gave up on his own control."

But, says the manufacturer, a suggestion may work out as a standard, sometimes for future models. He cites an overload device to kick off the motor, something a user requested and now an optional feature on all his hoists.

This hoist manufacturer often sees battles between users and their own companies. Small foundries, he says, are notorious for buying 10-ton cranes to lift 20-ton loads. This may not break the crane the first time. But a shock load may eventually make the weakened crane fail. Steel warehouses do the same sometimes, he adds.

It's false economy to buy light, he says, even though there's a safety factor of 500 percent. When you buy a crane of twice the capacity, the price goes up only 25 to 50 percent. A good 20-ton crane may last 40 or 50 years. But it's dead in 15 years if it has to carry 30-ton loads consistently.

The hoist manufacturer says he knows the user may be pressured by his company to buy cheap. He knows he shouldn't. But he figures he won't be around when the equipment fails; it'll be his successor's headache.



What's to do? Our hoist man says we must educate those who control the purse strings. They may be taken in by manufacturers who oversell, who make fantastic claims for their equipment. But after they find they've bought nothing but trouble, they learn to stick with the reputable manufacturer. This may be hard on the equipment maker if he has to wait long for the user to wake up.

Hit the Dirt, Men!

"We try to make our trucks versatile, and we make a big line," says a large manufacturer of fork trucks. "But even so, we still can't please everyone."

He points out that some users want trucks shorter, heavier, and thus more costly. Others, he says, want the trucks longer, lighter, and cheaper. The manufacturer must decide which will do the best job for most users and then sell it for the best price. The alternative, he continues, is to custom-build every truck from the ground up, a very expensive proposition.

"There's a battle," he says, "in the analysis of competitive specifications. The user should compare all specs, including those that can't be put on paper, and then make up his mind. He should know that first cost often may be least important. He must try to determine what maintenance costs will be, availability of parts, whether he can use a longer truck at sacrifice of storage space. The manufacturer, for his part, tries to make a truck that's a happy average for most users."

Expect difficulty, he says, where drivers are widely separated from purchasing and procurement. Purchasing and procurement are not always best at determining top value because above all they feel they're most effective when saving money. So, they may short change on other values. Price buying is OK, says the manufacturer, when you're assured of equivalent quality. But, with complex equipment, equivalence is hard to determine. One lift truck, he says, is NOT just like another.

But purchasing and procurement aren't always the villains, he says. Sometimes users are prejudiced, for example, favor a truck because they like the location of the controls. They may insist on their choice over the objections of the purchasing people.

Our manufacturer says buying an undercapacity truck costs more over the life of the machine. "A lot of users think they're better at engineering than our engineers," he says. "But I have yet to see one that is. If you buy a 5,000-lb. truck to lift 6,500 lb., you'll have breakdowns, have to replace major parts, endanger drivers, have insurance and liability difficulties."

The answer? He says his firm is happy to design special equipment, but not without a sizeable price tag. You buy staying power in a lift truck. You also expect service and interchangeability of parts. To get these, the manufacturer hires and maintains large and well-qualified engineering departments. This entails a lot of record keeping and cost.

A conveyor manufacturer puts it like this:

"There's more of a concept approach to selling conveyors than in selling fork trucks. We sell more the job to be done. The truck maker sells capacity. Overloading does not trouble us much, although we see it from time to time.

"Our biggest trouble? When the conveyor a buyer needs falls between two of our standard conveyors. He may want a conveyor 15 inches wide while our standards run 12 and 18 inches wide. Why standardize? To make a better product, one that is always available, one for which there are parts on hand years later.

"When users object to standards, we try to show we're better judges of good design. On the other hand, if they insist, we don't hide behind standardization. We'll make a special if we can."

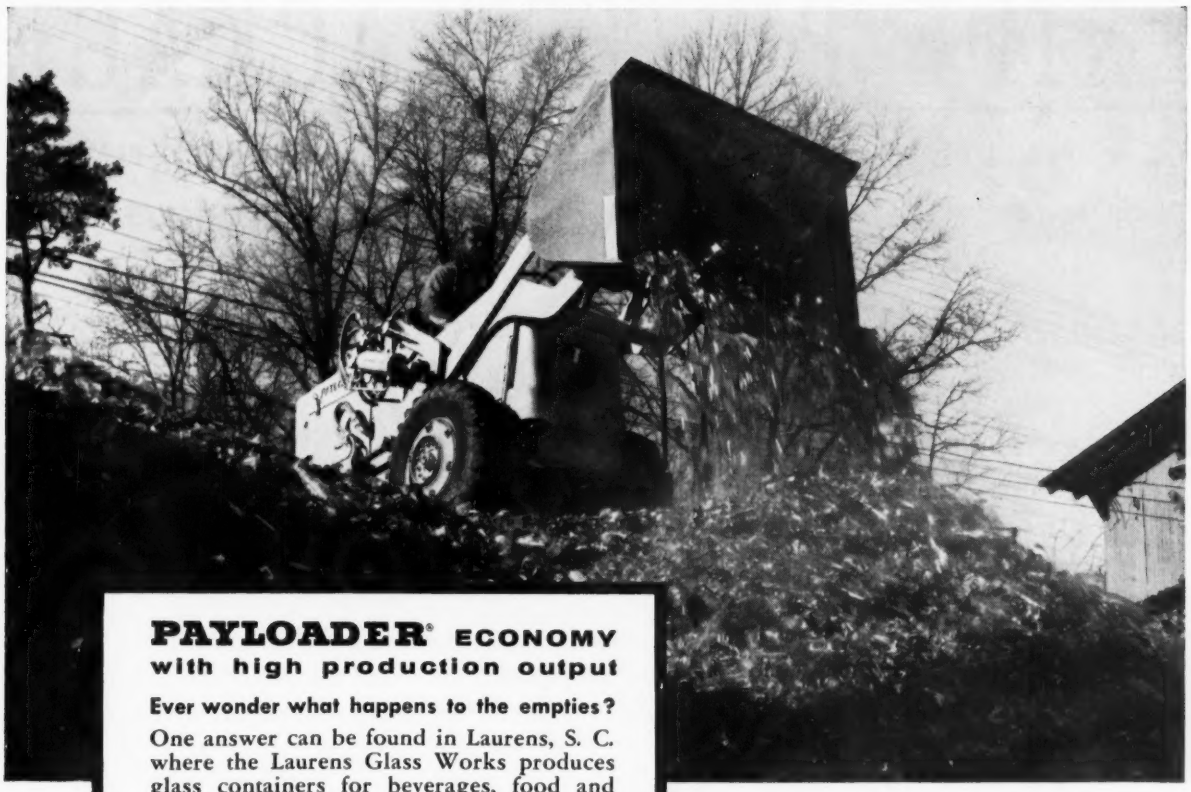
The conveyor manufacturer says there's a tendency to buy price during business slowdowns. But price buying, he says, is the last resort for most good users. They're interested first in value and quality, and this generally holds true in good times and bad.

Can We Resolve the Battle?

Users and manufacturers pretty well agree on the need for education. That is, both must get to know what the other does, why he does it that way, and what the limits are.

Material handling is a field of special equipment; even standard items often must be modified. Both groups have to realize this costs more.

You can spread the extra cost over everything manufactured. Or it can go on the special item alone. Either way, the user pays because you can't get something for nothing. ♦



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Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa. ESB

WHICH BATTERY FOR RAMPS AND CONCENTRATED HIGH POWER DEMANDS?

In any electric industrial truck application, the best battery choice is the one which meets the requirements of the particular conditions of use. Different applications may call for different types of batteries. And Exide offers the broadest line so that you may meet your own requirements most exactly. It includes the high capacity Exide-Ironclad with either square or round tube positive plate construction; the long-life Exide nickel-iron-alkaline (invented by Thomas A. Edison); and the Exide-Powerclad premium flat plate.

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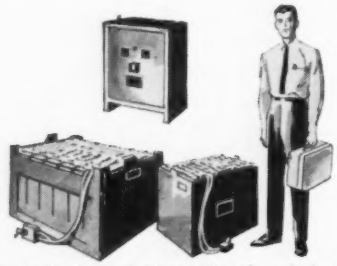

The Exide Power Package: Broadest choice of all types of batteries and chargers to meet all requirements, plus factory-quality service for both batteries and chargers.

Which battery gives you the maximum capacity? There is no secret to it. Today's advanced-design TGS Exide-Ironclad electric truck battery has more capacity per unit of volume than any other—11% more than the second most powerful battery. It is available now in ratings for all trucks—both rider and walking types—which use 22⅝-in.-high batteries.

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Exide-Ironclad is the lead-acid battery with tubular construction of the positive plate. Ever since Exide introduced this design, over 50 years ago, it has constantly led the motive power lead-acid battery field in capacity, life and economy.

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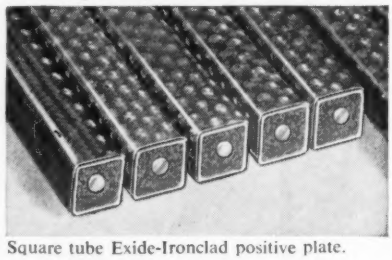
A complete analysis of total battery power operating costs for electric trucks proves that maximum economy may be achieved only by considering the entire power package: battery, charger and required service. This is all included in the Exide Power Package. Your Exide representative recommends the particular combination of equipment and service called for by your conditions. So you are assured of having adequate capacities to do the job, yet you are not paying more than you should because of capacity you don't need.

Ask about the Exide Power Package for your trucks. Call your nearby Exide man. Or write Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa.



Square tube Exide-Ironclad positive plate.

Exide®

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Choose the right scrap handling system

1. NETWORK of 28 lateral conveyors feeds into a 1,500-foot main scrap line at the Ohio Stamping Plant of the Chrysler Corp. at Twinsburg, Ohio. The main scrap belt is sunk below the basement floor, runs the full length of the plant. It rises 70 feet and discharges atop a baler house. Main belt has cleats that help the scrap flow, prevent jamming. Trim (cut off metal) drops into chutes on the presses, then into gravity chutes in the floor.

INDUSTRY today collects, segregates, accumulates, and disposes scrap in as many different ways as there are recipes for mixing a martini.

You still find scrap handled by hand. It collects on the floor. Then a man shovels it into a wheelbarrow or drum. But companies large and small realize that they're often losing money through costly handling and by not sorting. Many plants now are handling scrap semi-automatically and are sorting it properly. Scrap handling programs CAN pay by cutting handling costs, by producing more scrap revenue. Good scrap handling can mean the difference between profit and loss.

Some scrap is so valuable that many companies sort it into boxes marked brass, copper, bronze, aluminum, magnesium, etc. This reaps top dollar from the scrap dealer.

Like any other handling, it takes study to decide how to remove scrap most effectively. You have to know the volume, the physical characteristics, its final disposition. And you must consider frequency, distance, and unusual circumstances.

These are the kinds of scrap you're apt to have to deal with:

1. **Metal scrap (ferrous and nonferrous.)**
2. **Paper.**
3. **Food.**
4. **Rejected production items.**
5. **Scrap rubber.**
6. **Scrap leather.**
7. **Scrap plastics.**
8. **Fluids.**
9. **Grains and dusts.**

You have your choice of two sorts of removal systems. There are collection systems, where the scrap goes first into containers and later is removed. Then there are automatic systems. Here the scrap is removed instantly. While this article mainly follows metal scrap, the systems described can often be applied to other types of scrap.

What To Consider In Selecting a Scrap Handling System

In brief, you want the system that requires the least handling, the fewest number of men, and one that uses the least equipment. But first ask yourself this question: Can some or all of the scrap be eliminated?

Consider these short-cuts:

- Use the smallest diameter bar in turning operations.
- Use tubing in place of solid bars.
- Minimize the amount of waste from burning operations by inter-locking shape of piece parts.
- Minimize the allowance for finish on forgings and castings.

On general purpose machine tools:

- Provide sheet metal shielding to catch chips or slugs and direct them into container.
- Arrange for periodic chip removal so that catch bins do not overflow and necessitate unnecessary floor sweeps.
- Provide color-coded receptacles for chip and waste handling.
- Use chip breakers on turning tools to eliminate long spring type chips.

On special purpose machine tools or long running operations, consider specialized mechanical handling design for the particular application.

To analyze the referred scrap handling system, survey the production process from incoming raw materials to the finish of the product. Each operation creates some scrap. This must be handled from the plant to the scrap yard. And sometimes, back to the mill for return to new steel. Here's a procedure.

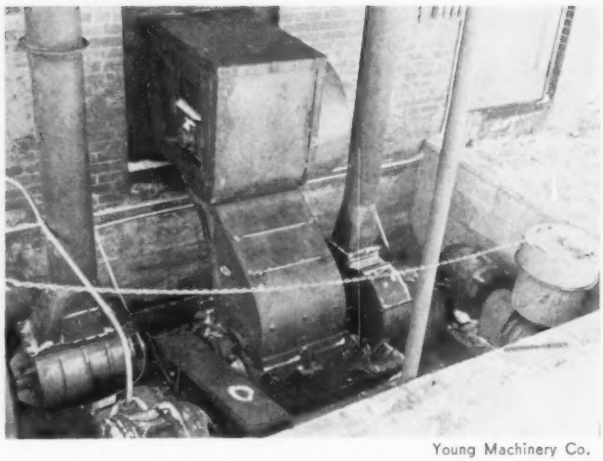
1. **First you consider exactly what kind a volume of material you will get rid of daily. That will give you an idea of the value of the material and of the capacity of the equipment you'll need.**
2. **Next, try to see what difficulties you might have in moving the scrap to its final destination. If aisles are narrow and distances great (as in an automobile assembly plant) you may have to bale your scrap first at their source.**
3. **Now, how much manpower do you need? How much would be required with a renovated or an improved scrap handling system?**
4. **Is there a fire hazard, as in a paint plant? This rules out certain equipment.**
5. **How much floor area can you give to scrap equipment?**
6. **How much space can be saved by new and improved waste disposal equipment?**
7. **How long will it take to pay out the new scrap and disposal equipment?**

Scrap Production Light?

Rules of the road: Where the volume of scrap is light, it's generally best to let it pile up at the point of origin in a portable container. Move the container at the end of a shift, or every few hours, to a central collecting point. The container may be a skid box, box-type floor truck or trailer, self-dumping hopper skid, or a steel barrel. Or you may transfer the scrap directly from the machine to a powered wheelbarrow or similar vehicle.

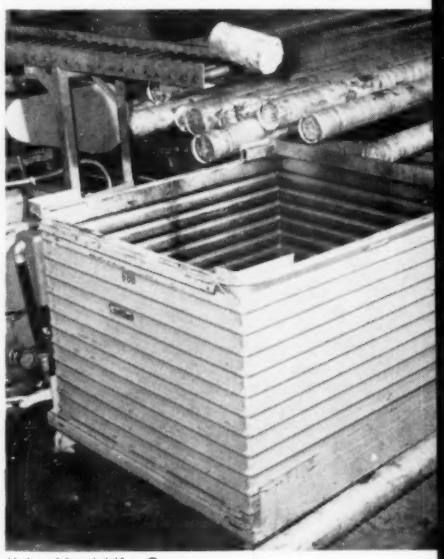
Sometimes you can get the scrap to drop right into the containers from the machines, such as punch presses and shears. Inspection centers can conveniently drop rejects directly into containers.

You can buy small conveyors that will carry away scrap as well as finished parts from machines. Belt conveyors are often used this way. The belts may be metal, rubber, fabric, or other material. Apron conveyors are good for chips or turnings with sharp cutting edges that would damage nonmetallic belts,



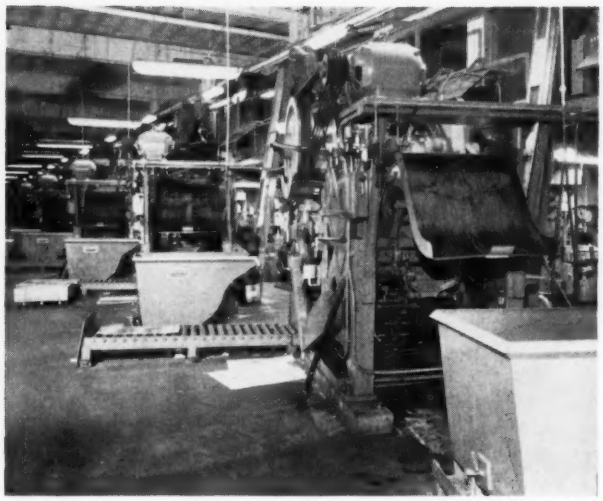
Young Machinery Co.

2. SCRAP SAWDUST handling. At top center is the end of a drag conveyor bringing sawdust from an interior bin to the hammer mill in the center foreground. The uniformally ground product is then elevated by the suction of the fan immediately to the right of the hammer mill, passes through a cyclone, drops through the tube at the left into the rotary feeder. Air pressure created by the power package at the far right picks up the material as it passes through the feeder and conveys it 160 feet away to a waiting rail car.



Union Metal Mfg. Co.

3. DROP-BOTTOM SCRAP CONTAINER (right) is stationed at a billet saw. Note the piece of scrap dropping off the roller conveyor. This is a typical illustration of the scrap system where scrap feeds direct from a machine to containers, is picked up by hoist, overhead crane or by lift truck to a loading area.

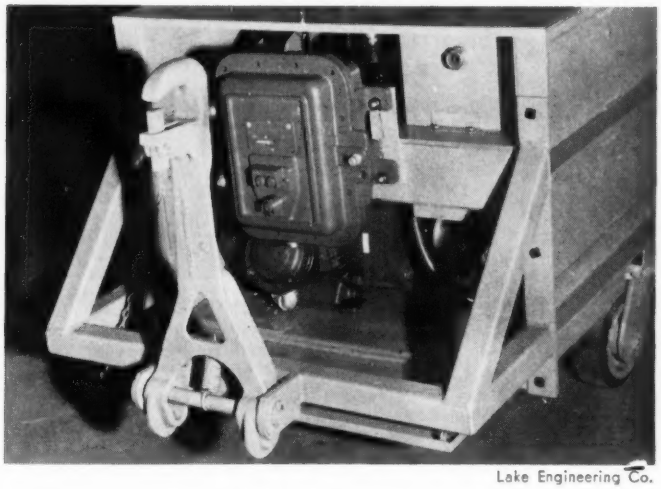


Roura Iron Works, Inc.

4. METAL SCRAP from high-speed punch presses collect in 40 self-dumping hoppers at the Baltimore plant of Crown Cork & Seal Co., Inc. Hoppers are one cubic yard capacity, are transported by an electric fork truck. Hoppers are positioned to automatically receive sheet skeletons as the material is ejected. When hopper is filled, fork truck operator takes it to a gondola.

Balemaster Div. of East Chicago Machine Tool Corp.

6. PICK-UPS at the five 3-knife in-line trimmers remove scrap trim and air convey it to separators located on the roof and directly over two balers and the scrap storage room. Automatic scrap paper handling and baling system handles and bales 40 tons of scrap paper a day for the Meredith Publishing Co.



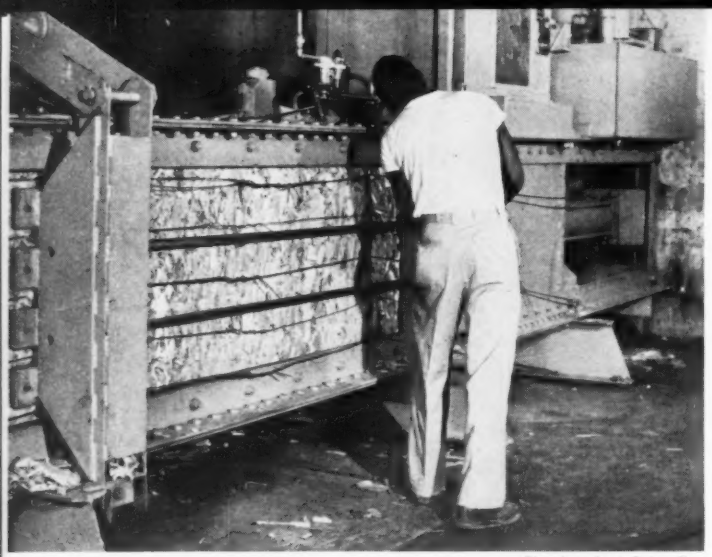
Lake Engineering Co.

5. PORTABLE BALER for in-plant disposal has a special trailer hitch so it can be coupled to a tractor. Janitor service moves the baler around the plant. This eliminates lugging empty upright corrugated cartons through the plant to the waste disposal area. An automotive company had this baler equipped with the hitch and special casters. Baler helps keep the aisles open and uncluttered, a tremendous problem in an automobile assembly plant.

or where these chips are long and springy and difficult to retain on a flat belt.

Here are some of the systems used by industry in the collection type system.

1. Scrap goes into hoppers, which are transported by hoist, overhead crane, or by lift truck to the loading area. They transfer the material into a big container (often holds 8 to 12 loads.)
2. Scrap goes into bottom dump boxes or a container or box fitted with channels. A crane or fork truck takes it to the loading area.
3. Scrap goes down a chute into bins outside the manufacturing area. When the bin is filled they transfer the scrap to a railroad gondola or truck by a crane equipped with an electromagnet.
4. Punch presses discharge scrap into box carts. When filled, it's moved to a loading platform. There, an overhead crane lifts the cart and dumps the scrap into a gondola or truck.
5. Scrap falls on the floor. A front end loader removes it.
6. Long pieces of scrap, such as shear trimmings, fall into corrugated open-end trays. One is placed behind a shear to catch trimmings as they fall. A fork lift truck carries the tray to the accumulation area and tiers it. Later, fork trucks dump the trays into gondolas or trucks.



The American Baler Co.

7. SHREDDED PAPER is easily handled by a continuous hydraulic baler. One man operates the entire system. Waste feeds into a hogger or shredder. It's then blown into a cyclone collector over the baler. An electric eye scans the material, and at the proper time, releases the shreds for automatic baling.

The Heil Co.

9. DETACHABLE CONTAINER SYSTEM is shown in operation. Here scrap is dumped alongside a railroad car. Material is picked up by a crane with a magnet and placed into a baler. Here it is hydraulically compressed into bale form—about a ton to a bale.

The Frank G. Hough Co.

8. TRACTOR-SHOVEL loads out scrap battery lead from stockpiles at Bers & Co., Inc. of Philadelphia. Front end loaders are used to handle scrap from the production area, in other cases scrap is fed to production. Photo shows loader feeding from scrap pile for lead smelting process.

Handling Larger Volumes

As the volume of scrap increases, manual removal becomes costly and impractical. Large plants have automatic scrap removal systems. Scrap falls from machines to a belt conveyor, which takes it to a receiver (hoppers, bins, balers).

In very large plants, they often plan for automatic scrap removal before building. Then they can put the scrap handling system underground, as in many stamping plants. At the machine, various systems may be installed to transfer chips to a collection conveyor or hopper. These may be simple chutes, or they may be vibrating conveyors to prevent pile-ups. The method depends on the characteristics of the scrap, whether it's mixed with solvents or cutting oil, and other basic factors.

Some large-volume sheeting operations have a special table-like conveyor with flights so a single operator can discard trim cuts automatically. The operator doesn't have to leave his position at the shear. The table-top tilts, deflects scrap into a container. In normal position, it carries cut plates or blanks to a stacker or other collecting unit.

Sometimes the volume of scrap is small but all the same you must remove it thoroughly and positively. The food and chemical industries, for example, must remove tramp iron. They do it with magnetic traps, drums, plates, or pulleys. Similarly, magnetic drums or pulleys in conveyor lines will remove iron from nonferrous scrap.

Yale & Towne Mfg. Co.

. **FORK TRUCK HANDLES** baled scrap two at a time. Bolsters between les permit easy entry of forks. Also, notice barrels that are placed four on a llet for easy fork truck handling. Large metal boxes also have sleeves attached derside to permit easy fork entry.

Dempster Brothers, Inc.

1. **REFUSE** from containers spotted around plant areas is easily picked up / hydraulic lift arms on compaction truck, turned over, and dumped. System's /draulic compaction plate in truck develops 85,000 lb. of thrust, squeezes 120 ı. yd. of scrap into 30 cu. yd. body. Compressed trash is pushed out from ack end of the truck at the dump.

Automatic Systems

Complete scrap handling systems may be built around pneumatic conveyors, say for collecting steel turnings from automatic machines. The turnings and cutting oil discharge directly onto apron conveyors installed above the floor. The conveyors carry the turnings to a work separator where bar ends and finished parts are removed. The turnings feed to a crusher where they're reduced in size for easy handling and efficient storage. Crushing also increases scrap value and permits maximum oil recovery. From the crusher, the chips are pneumatically conveyed to an oily-chip hopper for storage prior to wringing. The chips go from the hopper at timed intervals to a continuous chip wringer which removes the oil centrifugally at high speeds. The chips discharge from the wringer and are pneumatically transported to a storage bin where they're accumulated for shipment by rail or truck.

Other automatic systems involve only pouring of scrap into a skip hoist and pushing the starting button. From that point to delivery to the storage bin, transfer is completely automatic.

Is Baling Feasible?

Scrap is generally transformed into bales or briquettes for sale or reuse. The baling or briquetting process usually is incorporated into the overall system, and is automatic. A general rule to follow is that if the daily production of scrap is more than 30 tons, bale it.

You can incorporate automatic weighing equipment into the processing line of a baling press when size and weight of the finished bale are important. The entire baling sequence can be automatically controlled from the initial feeding of scrap from a feed belt to delivery of the finished bale. The scrap feeds by bulldozer, magnet, or other methods onto a belt conveyor which delivers the scrap to the automatic scale. The scale is set to the desired weighing, depending on the materials and bale sizes desired.

Many scrap dealers, smelters, and blast furnace operators require uniform scrap bales because of subsequent processing steps. Bales may be fed into blast furnaces which have relatively small inlet doors. When the weight is reached in the scale, an interlocking micro-switch stops the feed belt. The scale then holds the load until the loading chamber of the press opens to receive the scrap. This activates a solenoid discharge on the scale, opening hopper doors, and discharges scrap to the baler's loading chamber positioned directly underneath. After discharge, the scale doors close and the belt conveyor activates to resume feeding.

Handling Corrugated Scrap

Many parts fed into a process line come in corrugated cartons. Handling this corrugated scrap represents in some plants as much as 75 percent of waste materials. In most plants, a box truck system disposes them as well as other paper, paper products, and wood slats. The box trucks are spotted in each department and are filled with scrap materials. The janitor service takes them out to the disposal area, replacing the full box with an empty. This is the ordinary procedure. But there are two other systems. One is a shredder in each of several departments. The materials are removed via an automatic air conveying system to the disposal area. The other system uses portable presses. Just as fast as cartons develop in a department, they're baled.

Incineration completely disposes the revenue which may be gained from the sale of corrugated materials. This revenue runs from $15 to $20 a ton.

Other systems: pit-type baling presses, huge garbage disposal type masticators, and combination shredder-masticators and automatic horizontal baling presses. ♦

Keep up with the handling/packaging

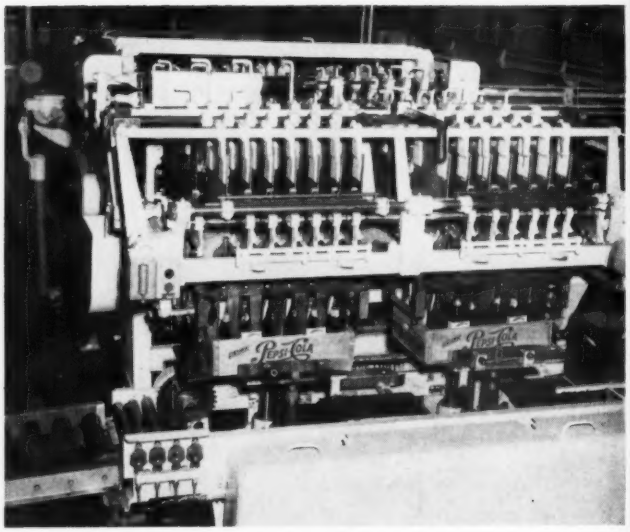
New machines, new materials make more to handle, faster

TRENDS IN PACKAGING and marking plant booby traps in the path of unsuspecting material handling system planners.

Some new machines and methods spew out cases of finished goods for storage or shipment twice as fast as the top speeds five years ago. And it's a good prediction that the push for higher speeds will continue, successfully.

For example: In 1958 top speed for loading a dozen 46-oz. No. 10 cans into a carton was 20 cartons a minute. Now it's 25 cartons, a 25 percent increase. Change to a continuous motion loading machine, with integral case forming and positioning, and the rate goes up to 40 a minute, 100 percent increase.

A change like that can drown shipping and storage. It can put new, heavier demands on handling methods upstream in the production system, too.



LOADING bottles into 6-packs, 400 a minute.

Packaging Speedup To Continue

Labor costs and pressures to get high return from investment in machines are the chief reasons why packaging machinery users put a premium on faster equipment. Both reasons are deep rooted, neither is likely to diminish its influence much. That's why it is safe to predict a continued trend to more speed.

Speeding up one machine often starts a chain reaction. You make can-filling equipment work faster. At once makers of glass containers and glass-container filling machinery redouble efforts to increase the speeds of their machines, so they can compete. At the same time makers of related equipment—carton unloaders, unscramblers, labeling machinery, cartoning and marking equipment—struggle to maintain the pace.

Technology Helps the Speedup

The rate of change is made greater by technological advances which happen to come just when they are most needed. Electronic devices have appeared on the scene, as if cued by the need for instantly-responsive controls for higher speeds. New plastics, tougher glass, lighter metals, better adhesives all add momentum to the rush toward faster packaging.

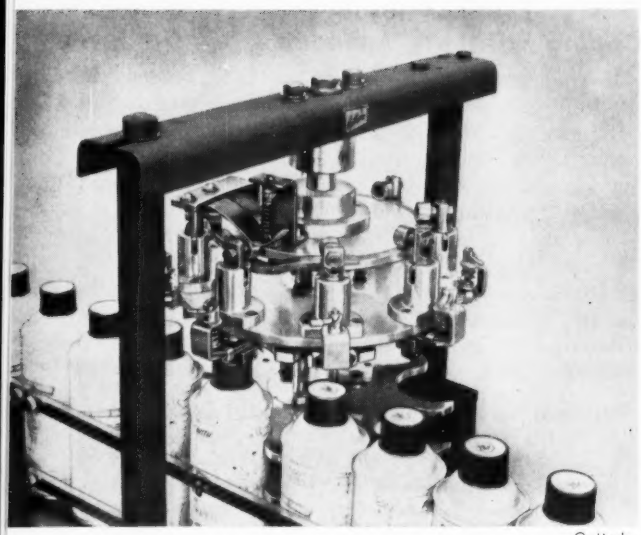
Materials Help MH, Sometimes

New and improved materials for packaging bring another kind of change that the material handling man must watch. They usually help him, because they are lighter, easier to handle. Cans are shedding excess weight. There are new ones made from impact-extruded aluminum, naturally light. To counter these the steel producers have developed lighter tinplate cans. And glass containers are still in the fight for their traditional market share, with weight-cutting designs. It all means lighter, easier-to-handle products at the end of the packaging line. Sometimes the difference may be large enough to permit the MH engineer to shade the weight-capacity requirements of his conveyors, lift-trucks, storage racks, etc.

But in some instances lighter containers may have less resistance to impact, to compression, and to the slap-dash handling in vogue on some shipping docks. This has to be considered.

Plastics continue to make news important to the material handling man. The use of foams is increasing, may take a terrific spurt in about two years, when some patent expirations are expected to reduce prices. You can do remarkable things with foams. Form them into packages, slap labels on the outside, and use the packages without inner bracing or outer wrap to ship fragile products by mail, express, or freight. Foams can conceivably make automatic the packing of fragile products that now demand hand work

narking speedup



Gottscho

CODING and pre-pricing machines work at 1000 a minute.

because cushions, braces, and other protective devices must be inserted in the package.

Packagers are using plastic bottles, bags, wraps, boxes, and liners in increasing quantities. Here again the caution light flashes to warn against inadequate MH planning. When a packaging material is new the machinery using it may be slow, but faster machines soon come along. A good example is the plastic bottle. You cannot fill plastic bottles now at top speed on automatic fillers—you have to run at low rates because the equipment is designed for rigid containers. Tomorrow new machines designed for plastic bottles will fill them at top speeds. It is smart to recognize the inevitability of improvements when you plan systems.

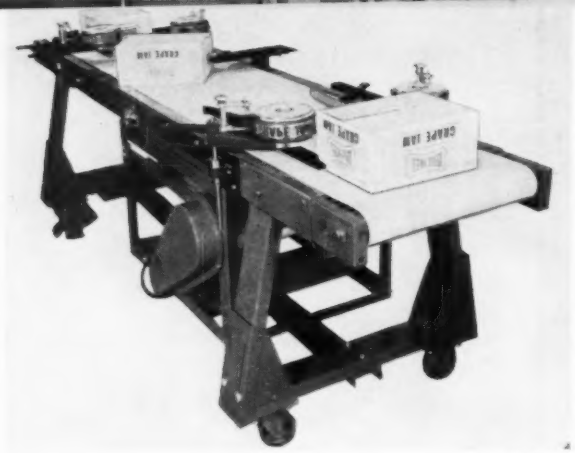
Labeling Catches Up

For a time labeling speeds sheltered subsequent operations from the fast rates of filling machines. The labeling rate was 200 or so a minute, and was limited because the glue adhesives available could not be handled faster. Then came thermosetting adhesives and the labeling rate went up. Prodded by this improvement the manufacturers of glues improved their adhesives, so glued labels go on as fast as the

REPRESENTATIVE RATES OF HIGH SPEED AUTOMATIC PACKAGING OPERATIONS

(x—shows increased speed since 1958)

Operation	Product Packaged, or Equipment Used	Package Units	Top speed, units per minute	
Can filling	Baby food	Cans	550 to 600	x
	Beer	Cans	1050	x
	Orange juice concentrate	Cans	850	
	Motor oil	Cans	625	x
	Viscous materials	Cans	950	x
Can filling	with oxygen purge; coffee	Cans	300	
Filling glass jars, bottles		Jars or bottles	700	
	Tablet filling, into 100-tablet bottles	100-tablet bottles	200-300	x
Aerosol container filling	High-speed automatic rotary equipment	Cans	200	x
Tube filling	Automatic equipment	Collapsible tubes	320	x
Pouch forming	Bulk products foodstuffs-liquids	Pouch package	400	
Blister packaging	Into 1 in. sq. blisters	Blisters	2400	x
Bag filling		Bags	40	
Vacuum Wrap	Meat slices in plastic film, with or without nitrogen purge	Packages	80	
Filling molded single cavity pack	Solid object	Packages	30	
Capsule filling	2-piece hard capsule	Capsules	260	x
Closure application, rigid aluminum foil packages	Food package	Packages	50	x
Applying aluminum foil hoods	Beverage bottle	Bottle	75	x
Automatic capping	Jars, pre-threaded screw-on type	Jars	300	
Automatic capping	Side seal caps	Jars	500-700	
Can labeling	12-oz. can	Cans	400	
Loading packages into cases	Photographic film	Packages	Up to 400	
Automatic case unloading	Removing glass containers from cartons	Cartons	18	x
Carton loading	12 No. 10 cans into corrugated case	Cases	25	x
	Continuous motion loading of cans, with integral case former and positioner	Cases	40	x
	Loading razor blade packages into carton	Cartons	500	x
Tape appliers	Apply length of tape to package	Length of tape	2000	
Stapling cartons		Cartons	14	
Automatic wrapping	Chewing gum	Single pieces	1000	x
	Hard candy	Single pieces	850	
	2-lb. set-up box in cellophane	Boxes	70	
	Frozen foods	Packages	240	
Palletizing	Cases on pallet, from conveyor	Cases	50	



Gottscho

CARTONS should have same marking or code as packages inside. This portable marker can be moved into conveyor line, marks cartons on 4 sides.

thermosetting variety. Now standard equipment applies labels at 400 a minute, and 600 a minute is in sight.

Even higher speeds may be feasible with roll-fed labels. These are now applied at 300 a minute, but the advantages of roll-feeding suggest intensive development. The roll-printed label costs less, it is easier to feed from a roll, and there is no chance of getting the wrong label on a bottle—extremely important in packaging pharmaceuticals. The roll-fed label is easily registered, to 1/16 in. or less, by an electric eye.

Marking and Coding

The next step beyond packaging and labeling is coding and prepricing. Coding equipment attaches to or straddles regular conveyors, and its operation is as much material handling as packaging.

Coding and pre-pricing are being used more and more. Coding by batch, lot, or consecutive number aids quality control. Coding can show the contents of a container if floods or other disasters destroy the label; defense authorities are in favor of this type of coding, and there is the beginning of a movement to set up a simple international code for foods and drugs. Codes also date products which deteriorate with time.

Pre-pricing means stamping the retail price on the package. Coding equipment which fastens on the conveyor or packaging machine is used. With this equipment it is easy to change the rubber stamp which makes the imprint, and for this reason the manufacturer can pre-price applying different prices, for different chain store systems, or even for different supermarkets in the same chain. It saves tedious hand work by store employees, prevents errors. Code imprinting equipment also applies legends required by local or state laws. Example: the special marking New York requires on flammable liquids. Sometimes the imprinters apply the complete label markings; in this way the manufacturer can provide small flexible packages with the retailer's house brand marking.

Usually markings that go on the individual package should also go on the shipping carton. This makes it easy to identify lots, and prevents errors in shipping. It also helps the receiver to identify the package. The advantage of outside marking might be even greater if there were a universal product code. Short codes are more quickly identified than product names, would help wholesale warehouses to sort and route incoming packages. A 3-letter code can be fitted to 15,000 different products.

Marking devices for coding, pre-pricing, and carton marking go at speeds up to 1000 a minute. They can be powered by the conveyor drive, or by the motion of the packages they mark. They may also be attached to the package filling machinery. Though simple in appearance, these are highly developed precision machines, some capable of positioning the imprint on the package within 0.001 in. They use special inks, make clear, sharp markings on almost any surface.

Coping with the Speedup

If your plant packages automatically, or may in the future, keep the main facts about the speedup of packaging in view. By being informed you can save yourself grief. Sooner or later you will have to move materials faster, in greater quantity, to feed top-speed packaging machinery and haul away its output.

As a nindication of the rapidity with which changes are taking place the table of representative top speeds is marked to show which have advanced in the last 30 months. It is significant that 13 of 36 have risen, and the average increase is 47%.

To cope with the speedup, you can take these steps:

1. **Keep posted about machine speed developments that can affect you.** Ask your packaging engineers what they are planning. Watch announcements by machinery manufacturers, talk to their salesmen, read articles in publications like MATERIAL HANDLING ENGINEERING.

2. **Don't worry about details until necessary.** You can be sure packaging speeds will increase, but you don't know how much. Don't waste time on details, be content with the big picture of overall effects, in terms of very rough estimates.

3. **Take the systems approach, and analyze the effect of a packaging speedup.** Trace the effects upstream in production, and downstream from packaging to shipping. In both directions you may have to change conveyor speeds and capacities, lift truck usage, storage.

4. **Consider alternatives.** You often have the choice of putting in faster handling equipment, or doubling up slower arrangements. Another possibility is working an extra shift where the rate of handling is slowest.

5. **Be ready with a good answer to the big question:** Your aim is to be able to give a quick but intelligent answer when management asks "What will speedier packaging do to handling?" Answer with an explanation of the equipment needed, a rough estimate of its cost, alternate ways of meeting the need.

6. **Find out now where to get reliable, detailed answers.** Spot reliable sources of facts and advice. Know where highspeed packaging equipment has been installed, who supplied handling equipment to go with it. (You find out by reading business publications). These are sources of information based on experience.

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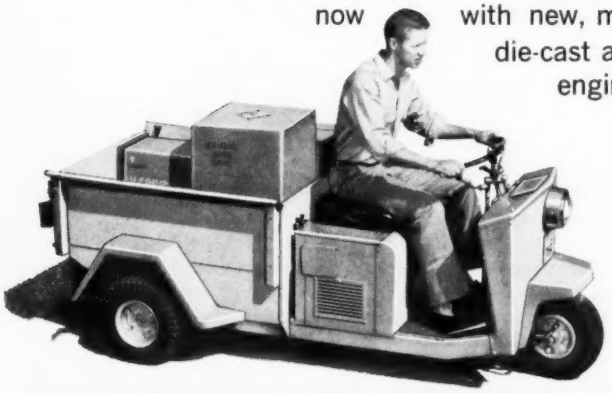

More for your transportation dollar because it's designed specifically for light hauling applications. Carries 800 pound payload. Built-in economy (low initial investment, minimum operating and maintenance costs) eliminates waste. Because of its compact size, the Truckster operates where other vehicles can't. It's ideal inside the plant, and on the street—goes everywhere, parks anywhere. Two new, advanced engines: Twin Super Husky, two cylinders, 18 HP; Super Husky, single cylinder, 9 HP. Optional equipment includes auxiliary transmission and all-weather cab.

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An efficient workhorse inside the plant or on short hauls. Maneuvers easily in tight quarters—carries half-ton payload up steep ramps and through narrow aisles. Offers built-in economy—low initial cost, minimum maintenance and operating cost. Up to 50 miles on a charge. Optional equipment includes all-weather cab, personnel carrier (shown).

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Either of these vehicles provides the ideal way to put supervisory, security and service personnel on wheels —and save 67% of the time they ordinarily spend walking. One-Passenger Electric operates in 25-inch passageways, has two cubic foot carrier space. Two-Passenger Electric operates in 40-inch passageways, carries quarter-ton payload. Either operates up to 40 miles on a charge.

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mhe BULLETINS CATALOGS FILMS

Sling Chains

Catalog S-261 gives complete information on the company's sentry slings, customized slings, and standard slings. Information on grades of chain available for sling chains and their specifications. Working load limits and specification charts.

Campbell Chain Co.

Circle **402** on Reader Service Card

Vibratory Feeder Data

This 46-page catalog covers syntron electromagnetic vibratory feeders. Complete descriptions, data, and specifications. Over 100 illustrations. Small, heavy, and extra-heavy duty feeders are presented.

Syntron Co.

Circle **403** on Reader Service Card

Work Centers Give Flexibility

Here's an executive portfolio which explains a work center system. Find out how flexible you can make your handling with the engineered components available as standard items. A handbook in the package details the system to the the Nth degree.

Alden Systems Co.

Circle **404** on Reader Service Card

Changing Your Conveyor?

Here's a 19-page booklet written to help you find the right conveyor components to best solve your handling problems, present or future. Covers the Custom Pak conveyor. Heart of the system is a section of gravity conveyor which can be inverted to form either a high or a low roller conveyor. To this basic unit, they add pressure frames, drive and idle ends, take-up units and motor mounts. All bolt together, and can be changed at will.

Materials Handling Section, Food Machinery & Chemical Corp.

Circle **405** on Reader Service Card

Steel Bins, Shelves, Carts

Thirty-two page catalog shows parts bins and shelving, service and stock carts, small parts cabinets, shelf drawers, stacking boxes, and modular work benches.

Bay Products Div., American Metal Works, Inc.

Circle **406** on Reader Service Card

Vacuum Handling

Catalog VL-1 explains Vac-U-Lift systems. Company says they can handle any object regardless of weight, shape, or size. Many action pictures. Sketch of a typical system. Details standard systems, and tells also how systems are custom built to fit your specific needs.

Vac-U-Lift Co.

Circle **407** on Reader Service Card

Industrial Trucks and Trailers

Literature covers the Ohio line, in various sizes and capacities. Company says its standard and specially-designed units offer you sturdy construction, and long continuous service at minimum cost. One item covered is a 30-ton capacity die trailer.

The Ohio Galvanizing & Mfg. Co.

Circle **408** on Reader Service Card

Manual on Boxcar Loading

Pocketsize 16-page manual of precise instructions on how to use Sparton SEL boxcar dunnage system to prevent damage to boxcar loads. Illustrated to show parts employed, method of application, and proper loading.

Sparton Railway Equip. Div. Sparton Corp.

Circle **409** on Reader Service Card

"Stop Labeling with Dollar Bills"

That's the title of a brochure for a label gluer featuring the "clean-speed" method. It eliminates old-fashioned, messy, wasteful glue pots and brushes. You choose the right glue for the job, apply it just right without waste. Find out how.

Glue-Fast Equipment Co.

Circle **410** on Reader Service Card

Plastic Tote Boxes

Bulletin describes standard design plastic tote boxes, available in 8 sizes from 8 x 11 x 2½ in. to 17 x 22 x 8 in. Regularly supplied in 3 kinds of plastic, but can be made from other thermoplastic materials on special order. Covers and dividers available.

Nermel Corp.

Circle **411** on Reader Service Card

Roller Skid Moves Heavy Loads

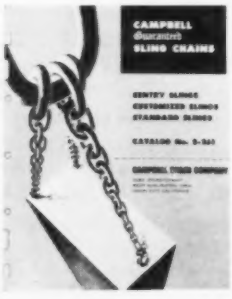
Roller skids replace usual pipe-and-roller expedient method of moving heavy equipment. Roller skid is a compact device supporting weight on rollers linked by an endless chain, like the track of a crawler tractor. Typical roller skid can support 5 tons or more under average conditions, puts low unit pressure on floor. Folder gives specifications for 4 models, describes use with fork trucks and other ways.

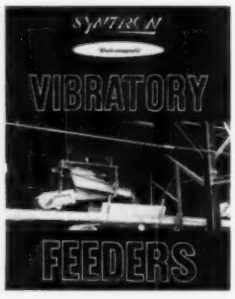
Stokvis Multiton Corp.

Circle **412** on Reader Service Card

Plastic Tote Trays

Four-page brochure covers the company line of plastic tote trays.





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5	20	35	50	65	80	95	110	125	140	155	170	185	200	215
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220
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13	28	43	58	73	88	103	118	133	148	163	178	193	208	223
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225

COST CUTTING IDEAS

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301	313	325	337	349	361	401	413	425	437	449	461
302	314	326	338	350	362	402	414	426	438	450	462
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304	316	328	340	352	364	404	416	428	440	452	464
305	317	329	341	353	365	405	417	429	441	453	465
306	318	330	342	354	366	406	418	430	442	454	466
307	319	331	343	355	367	407	419	431	443	455	467
308	320	332	344	356	368	408	420	432	444	456	468
309	321	333	345	357	369	409	421	433	445	457	469
310	322	334	346	358	370	410	422	434	446	458	470
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BULLETINS CATALOGS FILMS

The trays have cavities to fit any shape or multiple of shapes. The company process eliminates dies and molds, which makes the low-cost trays feasible for nearly any operation involving handling, shipping, production, or storage.

Patti-Plastics Corp.

Circle **413** on Reader Service Card

Hand and Platform Trucks

Truck Catalog T-60, 40 pages, provides pictures, descriptions, and full specifications for the entire line of Fairbanks Two Wheel and Platform trucks. A double spread chart gives recommended load ratings.

The Fairbanks Co.

Circle **414** on Reader Service Card

Vibrating Trough Conveyors

Heavy duty pan type vibratory conveyors, for handling hot, abrasive, corrosive, sticky, and other difficult to handle materials. Line includes counterbalanced, spring-supported units; variable stroke and positive action conveyors popular for handling sand and castings.

Simplicity Engineering Co.

Circle **415** on Reader Service Card

Automatic Extension Reels

Catalog 505 shows hundreds of reels and all types of classifications. Covers the Appleton Reelite line for electric cable, air, liquid. Special reels are available for tool balancing and static discharge for grounding. Reels are spring and motor driven, explosion-proof, and non-explosion proof.

Appleton Electric Co.

Circle **416** on Reader Service Card

Flat Box Printer

Literature describes the Algene fully automatic knock-down carton printer. Hopper fed. Printing speed: up to 3,000 cartons an hour. Specifications and measurements. List of optional features. Company points out that you can reduce your inventory of preprinted boxes.

Algene Marking Equipment Co.

Circle **417** on Reader Service Card

Production Chairs

You buy good chairs for office workers, why not for factory workers, too? That question is asked in the opening page of Catalog 5001-R. Catalog presents the complete Royal line of industrial chairs and stools. There are chairs and stools to fit every worker, to fit every plant operation.

Royal Metal Mfg. Co.

Circle **418** on Reader Service Card

Belting Catalog

This 32-page Boston Belting catalog has 3 main sections: conveyor, elevator, and transmission belting. Data include charts on approximate belt weights, approximate belt gages, a comparable belting reference chart, Boston belt recommendations, and a comparison chart of synthetic fabrics.

Boston Woven Hose & Rubber Div., American Biltrite Rubber Co.

Circle **419** on Reader Service Card

Conveyor Equipment

Catalog A-101 is a complete look at the entire company line. Numerous installation photos, charts, sketches, and complete specifications. Ten main sections include: gravity wheel, wheelrail, gravity roller, live roller, slat and chain, portable belt, horizontal belt, and floor-to-floor conveyors.

Sage Equipment Co., Inc.

Circle **420** on Reader Service Card

Modular Work Stations

Bulletin 1257 describes Product-A-Flow modular members which can be quickly made into work stations. Step-by-step assembly pictures. Two main sections: one, how to order complete work stations from combinations, and the other how to order individual members for special configurations.

Products For Industry, Inc.

Circle **421** on Reader Service Card

Bulk Material Belt Conveyors

Bulletin 576 presents Meco belt conveyors, and shows them at work in Chemical, Plastics, and Non-Metallic Industries. The conveyors handle light or heavy, wet or dry, granular or lumpy bulk materials. Capacity chart. Pictures of component parts.

The Manufacturers Equipment Co.

Circle **422** on Reader Service Card

Shipping Labels

Ever Ready's shipping labels are easy to order by mail. Company says if you use 6,000 or more shipping or mailing labels a year, you'll find savings with them. Brochure gives full details.

Ever Ready Label Corp.

Circle **423** on Reader Service Card

Centrifugal Thrower Units

Bulletin 460 covers the company line. Essentially short, high speed belt conveyors, centrifugal action causes material to be thrown at high speed to a desired distance dependant upon the material handled and method of feeding the thrower unit. Three main features: easy operation by one man, no hand trimming, no exposure to dust hazards.

Stephens-Adamson Mfg. Co.

Circle **424** on Reader Service Card

LP-Gas Fuel Injector

Brochure describes the McClain models. They convert gasoline engines such as in industrial trucks to operate on LP-Gas (propane or butane.) Six main features are listed. Four sizes are pictured, and use recommendations are listed.

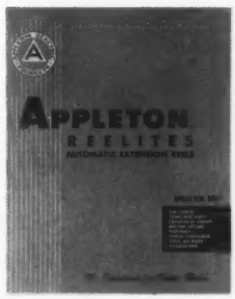
Peacock Corp.

Circle **425** on Reader Service Card

Casters and Wheels

The Divine Catalog 26 covers truck casters and industrial truck wheels. Complete specifications, sectioned views. Full explanation of catalog terms, and a section on factory symbols. Tips on how to choose the right wheel and caster. You can keep this catalog up-to-

Continued on next page



The Shortest Distance Is OVERHEAD

With Shepard Niles JOB-MATED Cranes

Traveling cranes deliver the goods **directly,** from point to point within your plant or warehouse, or even from one building to another.

They move masses of material faster, more efficiently–speed up production–because they travel **over** obstacles, not **around** them. And they leave passageways, work areas, and grounds free of moving equipment, with greater safety for your employees and materials.

Best of all, traveling cranes allow you to increase your useable storage capacity by eliminating aisles, and enabling you to store material up to the beams.

Shepard Niles JOB-MATED Cranes with auxiliary hoists are not merely handling devices, but versatile, highly engineered machine tools that contribute directly to increased production and profits. You'll find them ideally suited for your production and storage requirements. Write for complete details on how Shepard Niles JOB-MATED Cranes will improve your profit picture.

Member of Electric Overhead Crane Institute
America's Most Complete Line of Cranes and Hoists

SHEPARD NILES
CRANE AND HOIST CORPORATION

2762 Schuyler Ave., Montour Falls, N.Y.

Circle **98** on Reader Service Card

BULLETINS CATALOGS FILMS

date by filling out a card for additions and revisions.

Divine Brothers Co.

Circle **426** on Reader Service Card

Middleweight Industrial Trucks

For loads up to 3 tons there are Load-Lift skid, or pallet trucks to do the job; Safeway elevating trucks offer 1-ton capacity (12-in. load center). Elevating trucks are electric or pedal-operated; lift to 10 ft. 10 in.; feature 5th-wheel steering. Accessories include adjustable forks, crane boom, grabs, ram, slip-on platform.

American Pulley Co.

Circle **427** on Reader Service Card

Conveyor and Elevator Belt

Catalog 25CB will help you select belt for many unusual installations. The 17-page book is divided into 4 sections: general data, conveyor belt for general service, conveyor belt for special service, and elevator belt. Selection tables, specifications.

Raybestos-Manhattan, Inc.

Circle **428** on Reader Service Card

Floor Crane

Four page folder describes the Hydro-Boom. Company says it gives 1/100th of an inch precision control in 3 travel directions. Complete specifications on Model 110. Has 2,500 lb. capacity at minimum boom extension.

Vanguard Mfg. Co.

Circle **429** on Reader Service Card

Automatic Taping Machinery

For new or multi-use cases. Literature describes the Standard-Knapp Model M-10 Tape Line. Company says put this model on your gluer and watch it pay for itself. Handles up to 30 cartons a minute. Can be adjusted to handle various sized cartons in seconds.

Portland Div., Emhart Mfg. Co.

Circle **430** on Reader Service Card

Sling Handbook

Catalog SL-NO-3 covers the Tuffy line of slings. Types, dimensions, weights, and rated loads are all given. All models are sketched. Zinc

Continued on page 90

This

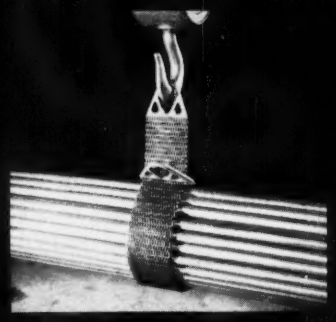
"SPIRAL OF STRENGTH"

Pat. App. For

helps make

GRIPPER® SLINGS

safer, stronger, more versatile than any other sling on the market



On the Gripper Sling, there is a stainless steel spiral that connects the new, slim, strong Gripper Sling handle with the metal-mesh body of the sling. This free-floating spiral is a distinctive feature of the Gripper Sling, and it is your assurance of a stronger, safer, more useful sling.

Stronger—because this stainless steel spiral gives 30% more wear resistance, 66% more tensile strength than carbon steel.

Safer—because the spiral is wound through the handle, not welded to it. The handle hinges freely back and forth, and since there are no welds, there are no breaks where the sling body meets the handle.

More useful—This new handle design and non-welded connecting spiral means there is more sling fabric on any given length of sling to grip the load when the sling is used in a choke hitch.

Gripper Slings, pre-tested and guaranteed, are available in standard widths and lengths for capacities up to 100,000 lbs. For handling delicate loads or polished stock, ask about PVC or Neoprene-covered Gripper Slings.

Mail the coupon today for full information or a demonstration. Or, contact your nearest Gripper Sling representative

THE CAMBRIDGE WIRE CLOTH COMPANY

Department W, Cambridge 5, Maryland

☐ Please send Gripper Sling Catalog and my distributor's name

☐ Please arrange a no-obligation demonstration

Name_____ Title_____

Company_____

Street_____

City_____ Zone____ State_____

Circle **16** on Reader Service Card

BULLETINS CATALOGS FILMS

versus soft alloys in socketing is covered by photomicrographs. Here are 36 pages of useful information, engineering data.

Union Wire Rope Corp.

Circle **431** on Reader Service Card

Crane Scale Obsoletes Weighing Stations

Literature tells you how to save money with the Chatillon Iso-seal crane scale. Available in 5 capacities from 6,000 to 30,000 lb. Chatillon says this scale makes weighing stations obsolete, as you weigh loads as they're moved. Action shots. List of features.

John Chatillon & Sons

Circle **432** on Reader Service Card

Self-Dumping Hopper

Literature covers the 1 cu. yd. Model FiA Phil-Dump. Company says this low-cost device is solidly built to take a beating when used with a platform or a fork lift truck. Points out that you can save time and money in the handling of bulk materials. Unit dumps automatically, returns to upright locked position. Stacks easily and safely for storage, either full or empty. Larger and smaller units available.

Salem-Brosius, Inc.

Circle **433** on Reader Service Card

Drum and Cylinder Carriers

Tray-Hart carriers can be mounted on any standard fork lift truck in a matter of minutes. Company says you get closer spacing of stored drums, and can do double and triple tiering. Folder shows the installation process of the drum carrier, explains in detail how it works.

Walz & Krenzer, Inc.

Circle **434** on Reader Service Card

Portable Hoists

Literature describes differential hoists. These lightweight, durable hoists are factory tested at twice rated capacity. Company says they're ideal in limited quarters, that their easy portability make them an excellent utility hoist for lifting, pulling, tightening.

Thern Machine Co.

Circle **435** on Reader Service Card

Low Cost Platform Truck

Literature covers the Prime Mover F-10. It has 1,000 lb. capacity on a 40 x 84 inch deck. Runs all day on a tank of fuel. Safety seat dead man control. Illustrations show it at work. Features, specifications, and a list of optional equipment.

Prime Mover Co.

Circle **436** on Reader Service Card

Mobile Storage Systems

Bulletin explains the Dolin mobile storage system. The method: elimination of aisles. Existing storage units are mounted on special mobile bases which roll along floor tracks. The mobile rows are arranged in front of each other. You use the reclaimed aisle space for more storage.

Dolin Metal Products, Inc.

Circle **437** on Reader Service Card

Belt Lacing Equipment

Circular 100 describes various models of belt lacers. Shows the different size hooks, and points out the importance of using the correct size.

Clipper Belt Lacer Co.

Circle **438** on Reader Service Card

Continued on page 92

SMOOTH AND EASY

THE BEST WAY TO DESCRIBE AMERICAN PANTOGRAPH LIFTS

AMERICAN'S Pantograph Lift Tables, in the M-1170 Series, have been designed for all industries using pallets or skids. The Pantograph Lift Tables are characterized by their small platform sizes, high travel, and capacity range

AMERICAN'S Series M-1202 Lifts are truly the "Jack-of-all-Work". Ideally suited for handling intermediate sized loads of sheet materials, bulky items, or heavy awkward parts.

AMERICAN'S Series M-1223 Lifts are designed for heavy industrial applications—to handle heavy sheet material, lumber, structural steel, brick and tile, as well as bulky, heavy or awkward pieces.

For Complete Information Ask for Bulletin AMC-1300

AMERICAN AUTOMATION EXPERIENCE

American MANUFACTURING COMPANY INC.

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AMERICAN AUTOMATION EXPERIENCE

Circle **6** on Reader Service Card

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Versatile "drive-in" solves space and handling problems

Here's the original "drive-in" boltless, adjustable storage rack . . . especially created by SPEEDRACK to meet your needs and specifications.

This patented, time-saving, cost-saving "drive-in" increases warehouse capacity. Safe storage—four or more tiers high—no stock crushing or falling. No space wasted by cross aisles. Drive-in accessibility reduces cost of in-and-out stock movement.

At no charge, SPEEDRACK will study your requirements and present an ideal, low cost solution to your storage problems.

Write today for FREE literature:
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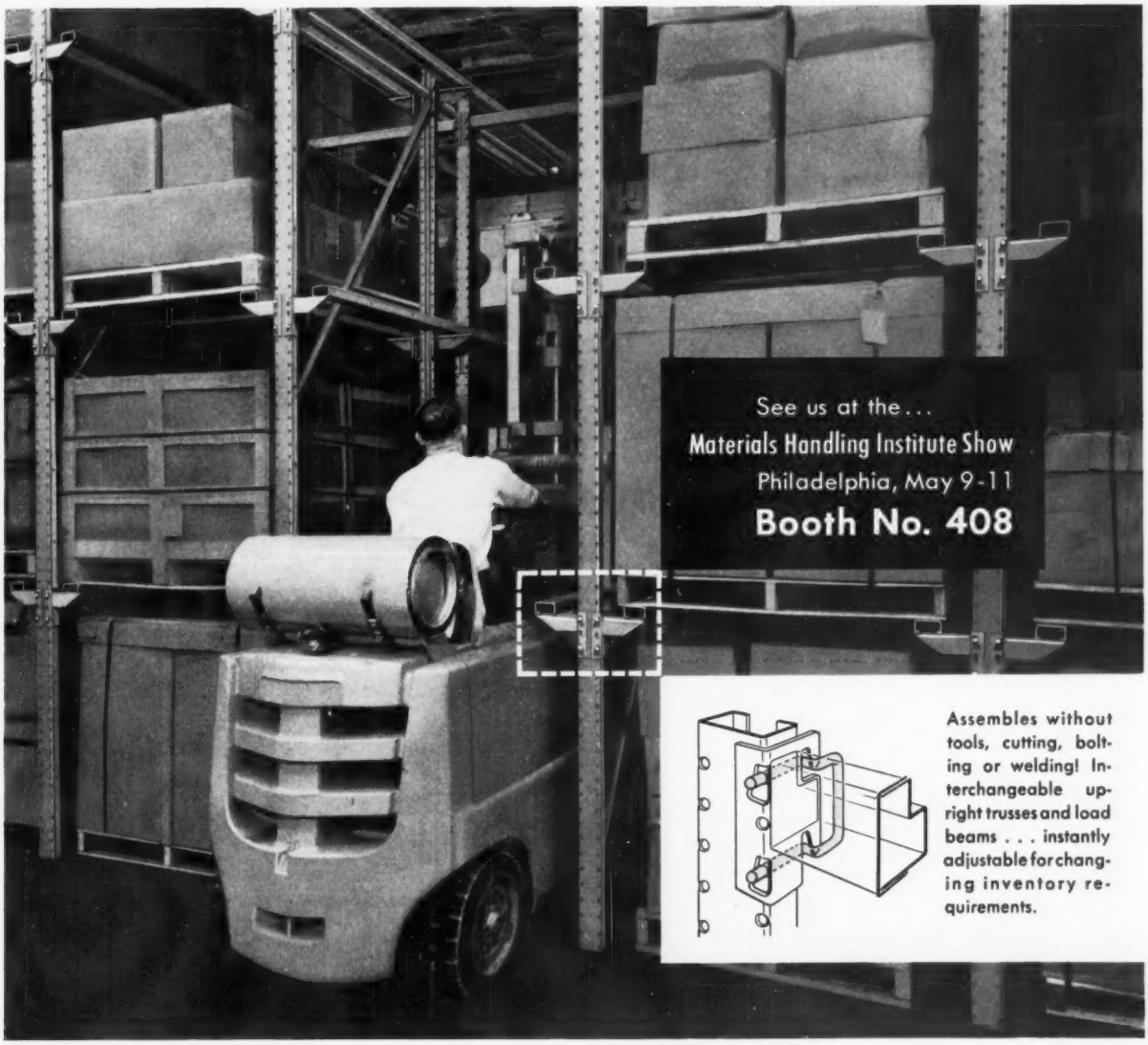

Assembles without tools, cutting, bolting or welding! Interchangeable upright trusses and load beams . . . instantly adjustable for changing inventory requirements.

speedrack® **SPEEDRACK, INC./SKOKIE, ILL./U.S.A.**
IN CANADA: SPEEDRACK, LTD. / WESTON, ONTARIO

Circle **104** on Reader Service Card

Take a new look at LP-Gas...

In a closed warehouse or cold room, carbon monoxide is just plain poison. A cause of frequent complaints and poor morale. But you end the fume problem for good when you convert to clean, safe LP-Gas. Because LP-Gas gives off virtually no carbon monoxide.

LP-Gas reduces maintenance, too. You can get 2 to 3 times the operating hours between overhauls—2 to 4 times the spark plug life. Oil lasts 5 to 10 times as long. LP-Gas is safe, economical. Conversion is easy from present equipment. Get the full story. Write: LP-Gas Council, 1515 Chicago, Evanston, Ill.

NATIONAL LP GAS COUNCIL

Circle 87 on Reader Service Card

BULLETINS CATALOGS FILMS

Overhead Traveling Cranes

How overhead cranes make handling easy explained in 12-p. booklet. Gives dimensions, span, weights, capacities for cranes from 3 to 20 ton capacity. Features emphasized are reliable drives, maintenance-free controllers, heavy duty hoists, anti-friction bearings. Line includes underrunning models for low headroom.

Abell-Howe Co.

Circle **439** on Reader Service Card

Pallet Containers for Small Parts

Junior Palletainers have same wire mesh construction, other features as standard warehouse models, but dimensions are: 32 x 20, x 16 in. deep; or 20 x 16, x 12 in. deep. Stack with regular 32 x 40 size. Bulletin illustrates 3 models.

Union Steel Products Co.

Circle **440** on Reader Service Card

42 Conveyor Transfers

Forty-two ways to transfer material on conveyor systems are presented in this data book. Each method is illustrated and described, pointing up the principle employed. Suggestions are given to possible types of applications. Typical transfers illustrated involve gravity to

One Euclid 10 ton Overhead Crane
+ One Euclid 3 ton Semi-Gantry Crane
SOLVES A TOUGH PROBLEM
IN PARTS HANDLING
In a Modern Machinery Plant
Handling costs were sharply curtailed with considerable reduction in manhours per unit assembly.
Overhead crane moves material to be processed to fabricating bay where floor controlled semi-gantry crane is utilized in welding of sub-assemblies.
A Euclid proposal for your particular plant is available without obligation.
Write for complete information.
EUCLID CRANES AND HOISTS
Raise Profits
THE EUCLID CRANE & HOIST CO.
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Circle **45** on Reader Service Card

gravity, gravity to power, power to gravity or power to power with change in direction of flow, change of condition, and change of conveying medium covered.

The Rapids-Standard Co., Inc.

Circle **441** on Reader Service Card

Shipping Container Mountings

Engineering description of elastomeric mountings for protecting fragile items from damage in shipping. Shows how to figure drop height, deflection, fragility factor, natural frequency of system. Bulletin 716 also show how mounts are used to package aircraft and missile components, electronic equipment, etc.

Exact Weight Scale Co.

Circle **442** on Reader Service Card

"Bigger Legal Payloads"

Title of a folder that describes the full range of Daybrook Aluminum Dump Bodies and matched load-rated underbody and telescopic hydraulic hoists. Units are for single and tandem axle trucks, trailers, and dump trains. Featured are comments from operators who have earned extra profit and who have cut operating costs with the engineered aluminum bodies and hoists.

Daybrook Hydraulic Division
Young Spring & Wire Corp.

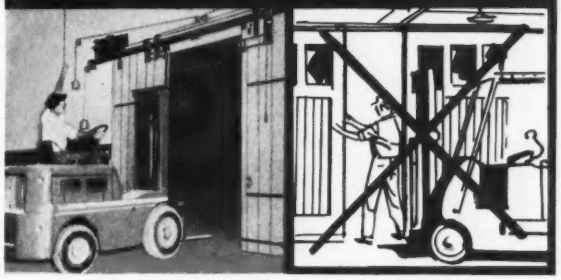
Circle **443** on Reader Service Card

Aluminum Truck Bodies

A 16-page booklet explains six major advantages of aluminum truck bodies. It tells why they give operators high payload profits because of long life, strength, low

Circle **94** on Reader Service Card

Waste motion costs time and money . . . speed up production traffic with



R-W ELECTRIC OPERATORS

FOR INDUSTRIAL DOORS AND GATES

R-W offers a complete line of heavy-duty, top-quality Electric Operators designed to meet the rugged demands of industrial use. R-W Electric Operators will help speed up production traffic, smooth the traffic flow, and eliminate heat loss in winter and conditioned air loss in summer. R-W Electric Operators automatically open plant doors as traffic approaches and then close the doors safely and smoothly . . . eliminates door slamming and rough handling. Whether it swings, slides, raises or folds, R-W can open it automatically.

Write for your free copy of Catalog No. 200.

RICHARDS-WILCOX MFG. CO.

420 W. THIRD ST. • AURORA, ILL. • Branches in all Principal Cities

when you look for dockboards
COMPARE SIZE . . . COMPARE PRICE . . . COMPARE CAPACITY *with*

Langsenkamp's DOCK PLATE

LIGHTWEIGHT—LOW-COST
SUPER STRENGTH ALUMINUM

GREATER CAPACITY PLUS ECONOMY!

Langsenkamp gives you an economical dock plate with greater work-load capacity to handle today's increased pay-loads.

It doesn't get tired! Special alloyed-aluminum has superior fatigue-resistance, giving Langsenkamp dock plates longer life.

Handling ease—Most sizes are so light in weight that one man can handle them easily.

9 Styles . . . capacities up to 15,000 lbs. Over 65 stock sizes from 24 x 48" to 96 x 60" plus all popular options such as fork lift brackets, side rails and stop pins.

Exclusive—Optional abrasive safety surface gives permanent non-skid protection even when wet!

F. H. LANGSENKAMP COMPANY

229 E. South Street
Indianapolis, Indiana

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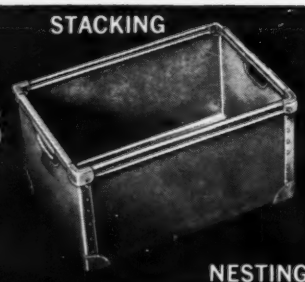
Circle **49** on Reader Service Card

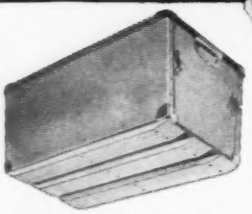
Fedco

STACKING

FIBRE BOXES TOTE MILL STOCK CONVEYOR



NESTING



CONVEYOR BOX with solid hardwood or runners on bottom for all types of conveyor systems.

Light, strong, durable. Expertly constructed for heavy duty. Body and bottom of superior grade fibre. For moving, storing or assembling small parts and materials. Made in sizes to your requirements.

Also a complete line of FEDCO Fibre Box Trucks and FIBEROK Disposal Cans. Write for Catalog.

Federal FIBRE CORPORATION

2626 Fourth Street, Dept. 7, Long Island City 1, N. Y.

BULLETINS CATALOGS FILMS

maintenance, low operating costs, attractive appearance, and lightweight. The aluminum bodies are gaining broad use in almost every industry involving delivery of products and supplies, consumer goods, and service.

Clark Equipment Co.

Circle **444** on Reader Service Card

Work Safely In Hazardous Areas

Bulletin 481A gives highlights of the Underwriters' Laboratories approved gas, LP gas, and diesel lift trucks in 2,000 to 10,000 lb capacities. Approved features make the lift trucks safe for use in the presence of ignitable fibers, combustible dusts, and flammable liquids and vapors. Ignition and other electrical terminals are covered with rubber boots. Battery has non-conductive cover to prevent an electric arc. The fuel tank on diesel and gasoline models is of heavier metal construction. Literature gives full safety details. *Allis-Chalmers*

Circle **445** on Reader Service Card

Caster File Portfolio

Two-pocket portfolio brings reader 44-p. Albion caster folder on one side. Other pocket offers special bulletins of recent developments, or data on casters of particular interest to recipient.

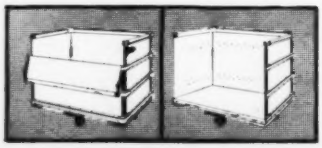
Albion Industries, Inc.

Circle **446** on Reader Service Card

VULCANIZED FIBRE

BOX TRUCKS

Drop Side and Open Side Models "Custom-Built" to suit your needs



Fedco

LIGHT • STRONG • MANEUVERABLE

ANY STYLE • ANY SIZE • Reinforced with heavy steel, rust proof rails and ribs. Inside completely snag- proof. Hardwood floors. Self-lubricating, easy rolling casters.

Federal FIBRE CORP.

Also FEDCO Tote, Mill and Conveyor Boxes and FIBEROK Fibre Disposal Cans. **Write for Catalog.**

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Circle **50** on Reader Service Card

Tubar HYDRAULIC

PALLET LIFT TRUCK

HIGH QUALITY! VERSATILE!

4400 lbs. Capacity F.O.B. Factory **$395.00**

MODEL 44

Specifications

Load Capacity	4400 lbs.
Fork height from floor	
	Lowered 3¼"
	Raised 8"
O. A. Width	23½" or 27"
Fork Length	36", 42" or 48"
Fork Width	6"
*Steer Wheels	8x2
*Load Wheels	3x3
Steering	180°

*Std. wheels are steel, floorsaver wheels optional at additional cost.

Ruggedly built, designed for hard usage. Fully automatic, forks are raised by pumping tow handle. Entry rollers in the end of forks facilitate easy entry into a pallet. Highly maneuverable truck pivots 90° in either direction. Can be used with single or double faced pallets.

This model is furnished with your choice of 36", 42" or 48" fork lengths and 23½" or 27" overall fork widths at no extra cost.

There's a TUBAR man near you . . . write to:

UHRDEN, INC.

DENNISON OHIO

Circle **110** on Reader Service Card

Cranes, Monorails, Vacuum Lifts, Trucks

In one 16-p. bulletin (246-R) Whiting packs information about 4 types of MH equipment—overhead traveling cranes, monorail systems, vacuum-handling equipment, Trackmobile rail-and-road trucks. Many pictures, diagrams show equipment and features.

Whiting Corp.

Circle **447** on Reader Service Card

Research Study on Big Bearings

Data for design, and application of large diameter anti-friction bearings are given in "Feasibility Study of Large Diameter Anti-Friction Bearings for Radar Antenna Applications," (Kaydon Engineering Corp., Muskegon, Michigan. 227 pages. $25). The information was developed in research work contracted for by Kaydon Engineering and performed by the Lincoln Laboratory, Massachusetts Institute of Technology.

Cushions Lift Truck Loads

Hydra-ride accumulators are detailed in a 4-page folder. Dimensions and other specifications on three sizes are included. Folder 1630B2 includes installation information. Company says the accumulators also lessen the danger of spillage and breakage, and reduce damage to the lift mechanism.

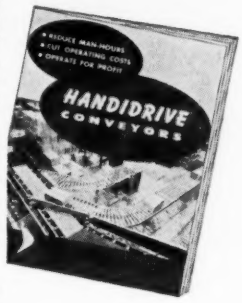
Parker Hydraulics Division
Parker-Hannifin Corp.

Circle **448** on Reader Service Card

Save up to ⅓ the cost of your next conveyor!

(FREE HANDBOOK SHOWS HOW)

Handidrive Conveyor Handbook shows how fast and easy you can install your next conveyor . . . how you can save up to ⅓ the conventional cost with "off-the-shelf" ordering and "do-it-yourself" planning and installation.



Describes roller conveyors (both gravity and power), belt conveyors, drive units, intermediate sections, curved sections, supports, hangers, and other needed items . . . all in stock to fill your order fast.

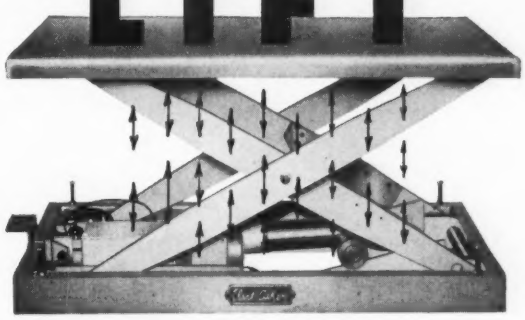
Send today for this valuable new Handbook. No obligation.

Standard Conveyor

302-E Second Street, North St. Paul, Minnesota

Circle No. **101** on Reader Service Card

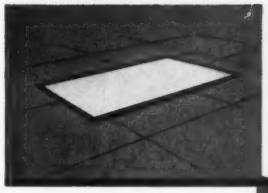
EASY WAY TO GET A LIFT



FOR LOADS UP TO 6000 LBS.—IN MATERIALS HANDLING SYSTEMS OR FOR CONVENIENT PORTABLE USE

Standard sizes afford a wide selection of heights that readily adapt them to changing requirements—from floor level to a height of 48" and will lift up to 6000 lbs. depending on the unit. Control is fast and sure for any height positioning and with electronic accessories automatic positioning is available. Special cradle tops are available for handling paper rolls and other cylindrical materials.

Clark-Aiken STANDARD LIFT TABLES

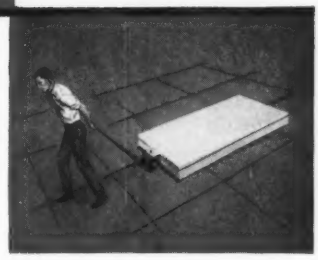


FLOOR LEVEL INSTALLATIONS WITH SAFETY TOE GUARD

Tables may be flush floor mounted with disappearing toe guards for safe operation.

EASY TO MOVE FOR PORTABLE USE

Portable unit is wheel mounted; makes easy mobility around the shop for your requirements.



Send today for informative bulletin. Tell us your requirements and we will recommend table size.

THE Clark-Aiken COMPANY
105 HART ST. LEE, MASSACHUSETTS

Canadian Representative: Gordon W. Keates
133 Flora Drive, Scarborough, Ontario

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Circle 85 on Reader Service Card

OPEN ANY FREIGHT CAR DOOR IN 20 SECONDS OR LESS with the

NOLAN SINCE 1909

ONE-MAN CAR DOOR OPENER

Write for complete details and railway products catalog

ONLY $45.00 F.O.B. Bowerston

The Nolan Co., 110 Pennsylvania St., Bowerston, Ohio

Circle 89 on Reader Service Card

engine exhaust . . .

"made safe enough for a baby"

CATALYTIC PURIFIERS

Practical, fully tested and approved, will make your industrial engine exhaust safer. Dangerous Cancer Suspect Hydrocarbons and Carbon Monoxide reduced to safe levels will increase employee productivity; increase profits. Oxy-Catalyst Exhaust Purifiers will convert gasoline, LP gas or diesel exhaust into harmless vapor for safer indoor operation of lift trucks, sweepers, engine-generators, construction and mining equipment.

Also inquire about our Fume and Odor Elimination Equipment for industrial processes.

AIR POLLUTION CONTROL

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Berwyn, Pa.
Catalyst for cleaner, safer Air

PORT-A-RAMP®

LIGHT-WEIGHT — NON-SKID WALKWAY PORTABLE — Brooks & Perkins *light-weight* Port-A-Ramp is the most improved portable ramp on the market today. Port-A-Ramp features a non-skid walkway which allows easy movement of material and increases safety. Port-A-Ramp is another member of the fine family of Brooks & Perkins . . . *Manufacturers of Magnesium and Aluminum Non-Powered Materials Handling Equipment.* Other products include: Dockboards—Hand Trucks—Stock Picking Trucks—Yard Ramps—Pallet Dollys—Pallets—Platform Trucks—Knockdown Racks. Write today for complete information on the Port-A-Ramp or any of the other products listed.

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BROOKS & PERKINS, INC.
1938 W. Fort Street • Detroit 16, Michigan
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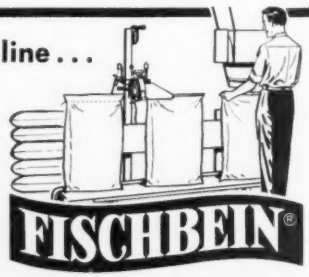
61-MH-6

Circle 11 on Reader Service Card

On production line . . .

or one at a time . . .



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BAG CLOSING EQUIPMENT

saves *time* and *money!*

For fast, secure closing of bags in any production application, you can depend on efficient, low cost FISCHBEIN BAG CLOSING EQUIPMENT... a complete line ranging from completely portable to fully automatic production line machines. Fischbein equipment performs reliably on all kinds of textile or paper bags.

WRITE FOR COMPLETE CATALOG—FILE OF ***FISCHBEIN BAG CLOSING EQUIPMENT***

DAVE FISCHBEIN CO. Dept. 4B
2720 30th Avenue S., Minneapolis 6, Minn., USA

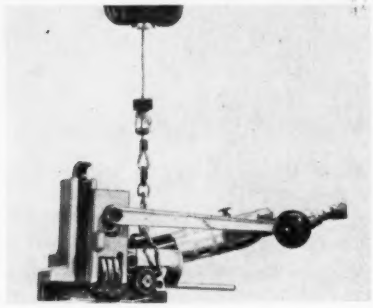
Circle 51 on Reader Service Card

PRODUCT NEWS

Continued from page 42

Fast Stretcher-Sealer

Lightweight, with air-driven take-up and automatic seal feed. Said to tension, seal, and score strap in less than a second. Weighs less than 13



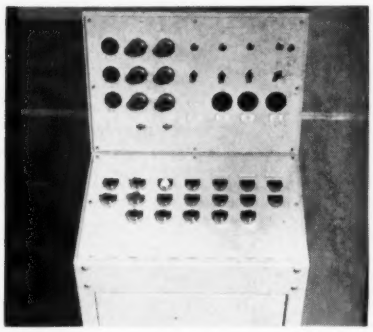
lb., works in any position. Operates at 60 to 90 psi, depending on tension wanted. Motor stalls when tension is reached. Muffler quiets air motor whine.

A. J. Gerrard & Co.

Circle **319** on Reader Service Card

Pushbutton Batching

UBC-100 works with any batch plant. Signal transmitters on dial scales and electronic control system accurately operate batcher gates and



weigh interlocks. Not dependent on operator skill. No spoiled batches, each to spec. Reliable, easy to operate.

Blaw-Knox Construction Equipment Division

Circle **320** on Reader Service Card

Push-Button Switch Foils Weather

All-rubber Flexitite switch shrugs off water and corrosion, says maker. It's recommended for 2-station push-button applications like open-close, up-down, etc. Sealed, molded construction, meets NEMA types 1, 4,

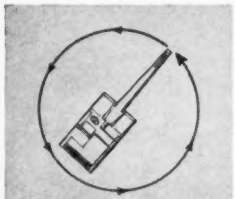
Continued on next page

SILENT HOIST KRANE KAR

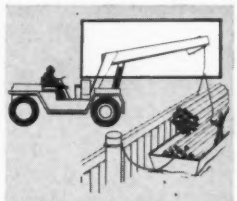
SAVES
$478.03 EVERY MONTH

says V. JAMES DeNAPLES
Technical Services Foreman
Norma-Hoffman Bearings Corp.

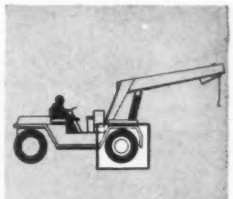
"This versatile yard crane simplifies our materials handling operations, cutting travel trips and saving us a considerable amount of work and time. Our KRANE KAR speeds unloading of incoming materials, transports and stacks them at storage . . ." RESULT: Monthly net savings—$478.03!



360° BOOM ROTATION—Hydraulic Crane revolves on heavy-duty, double-race ball-bearing turntable. Special manifold permits continual rotation and simultaneous, smooth, positive control of hoisting, topping, telescoping.



GREATER WORKING REACH—Boom is pivoted well forward to provide working reach of entire boom length! High boom underclearance permits efficient handling of bulky loads in box cars, trailers, etc.



MAXIMUM SAFETY—Dual traction tires means high flotation and maximum protection against tire blow-out upsets.
Bonus Capacity—Hydraulic outriggers step up working capacity to 24,000 lbs.

2 SIZES: MODEL FAX—12,000 lbs. • MODEL FAY—20,000 lbs.

ALSO AVAILABLE:
KRANE KAR—180° SWING BOOM—Mechanical Geared and All-Hydraulic Models. 5 Sizes: 1½, 2½, 5, 10, 12½ ton capacities.

Literature Available:
On 360° Swing Boom—Bulletin No. 99 On 180° Swing Boom—Bulletin No. 79

SILENT HOIST & CRANE CO.
BROOKLYN 20, N. Y.

Circle No. **103** on Reader Service Card

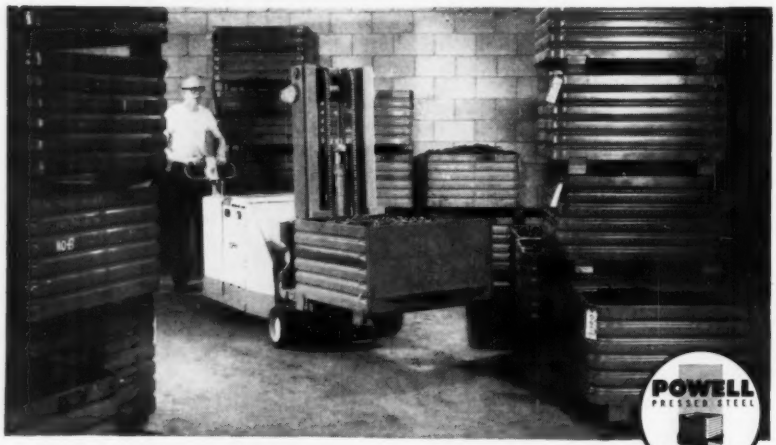
Powell Flow-Matic system in action on packaging line at Goerlich's, Inc., Toledo, Ohio.

Handling 50 million parts a year with POWELL'S *Exclusive Flow-Matic* System!*

Goerlich's Inc., working with Toledo Society of the Blind, stores, assembles, and packages 50 million muffler parts a year—using Powell's unique Flow-Matic materials handling system. Fast, simplified handling method that can save up to 50% in space handling areas. *Bulletin FM* gives all the details—write for it.

TM*

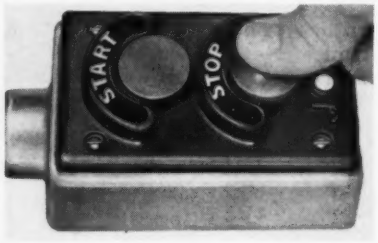
Unique Powell Flow-Matic boxes in storage area at Goerlich's, Inc. Easily handled and stacked.



THE POWELL PRESSED STEEL COMPANY
DEPT. 200-5 • HUBBARD, OHIO
The most complete line of material handling equipment.
Circle **90** on Reader Service Card

PRODUCT NEWS

and 5 enclosure specs, heavy and standard duty. Package includes

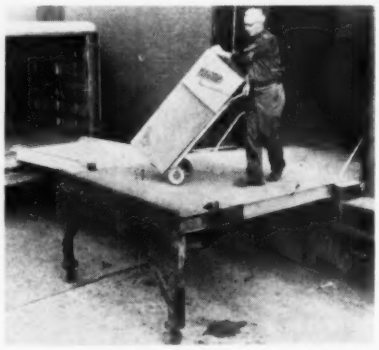


choice of legend plates, snap-in oversize buttons.

Joy Manufacturing Co.
Circle **321** on Reader Service Card

Narrow Alley Dock

Extensible platform nests in shallow pit below warehouse floor, pulls out readily into alley. Trucks back



up to it from either side. Another model stores on top of floor, pulls out same way. Packaged units, simple to install. All sizes, capacities.

A A A Equipment Company
Circle **322** on Reader Service Card

New Ball Caster

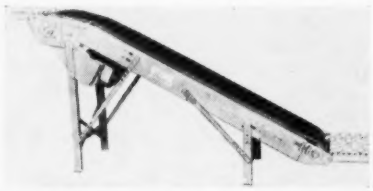
Get superior styling in this new ball caster for furniture and accessories. It has a wide tread, features easy swiveling to prevent damage to floors and carpets. Only three moving parts. Permanently lubricated, it won't squeak or bind. Comes in polished brass, satin brass, statuary bronze, antique, polished or satin chrome.

The Bassick Co.
Circle **323** on Reader Service Card

Conveyor Booster

Model FJ powered belt booster conveyor adapts gravity conveyors

to inclines up to 34°. Also good as floor-to-floor conveyor. Formed steel bed in 12, 20, and 24-inch widths.



Standard lengths to 32 ft. Rubber belt—3-ply, 28 oz. duck. Speed, 65 f.p.m., others optional. Many features, attachments.

Hytrol Conveyor Co., Inc.

Circle **324** on Reader Service Card

Film Anchors Parts

Polytite packaging machine applies tight plastic film cover to anchor parts

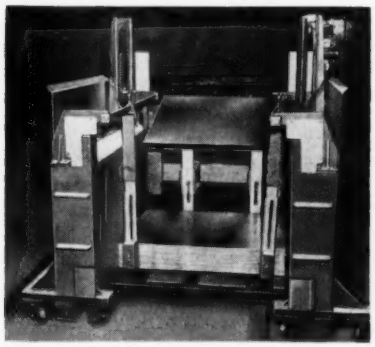
on corrugated board. Machine is light, moves easily for on-the-spot packaging of screw-machine products, electronic parts, hardware.

MfP Company

Circle **325** on Reader Service Card

Stacks Sheets, Blanks

Standard, adjustable stacker works behind shears, blankers, dry-coaters. Makes neat stacks on pallets, skids,

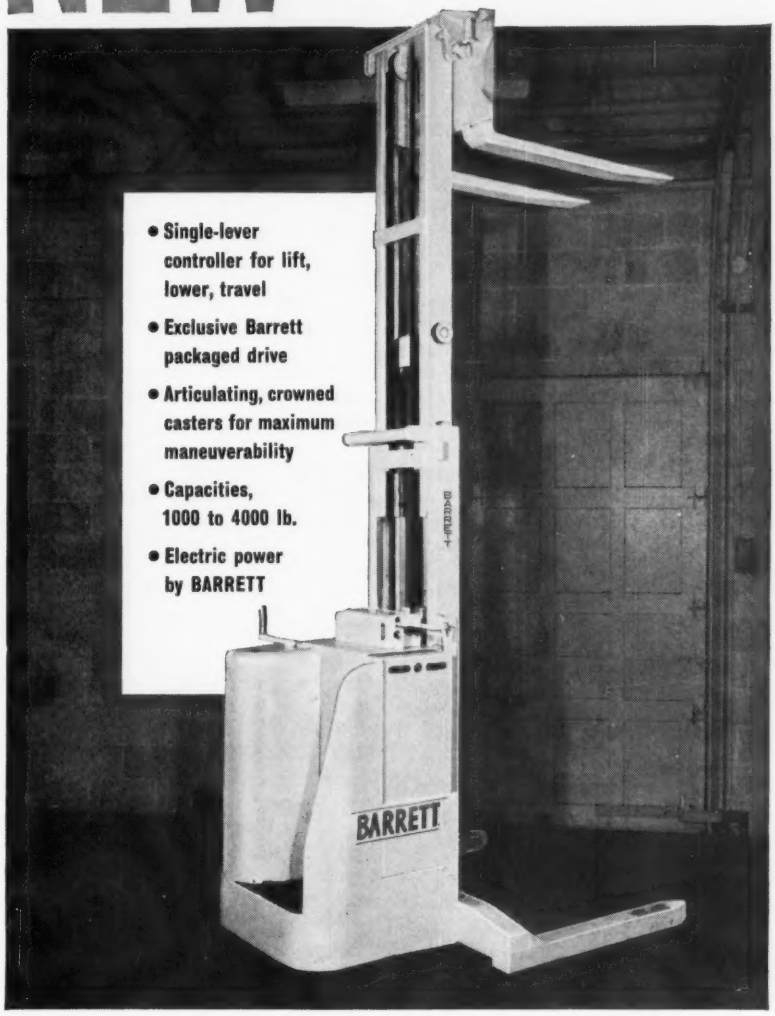


dunnage. Adjusts to sheet length and width, swings open for access to completed stacks. Adapts to multiple and continuous operations. Specials available with drop gates, etc.

Die & Automation, Inc.

Circle **326** on Reader Service Card

NEW a narrow aisle hi-stacker with exclusive features


• Single-lever controller for lift, lower, travel
• Exclusive Barrett packaged drive
• Articulating, crowned casters for maximum maneuverability
• Capacities, 1000 to 4000 lb.
• Electric power by BARRETT
BARRETT

Speed pallet handling in narrrow aisles to economize. Barrett's new Model RST Rider Straddle Fork Truck does it!

Easy maneuverability adds to efficient operation. Controls are right at hand. Proper leverage allows turning as easy as power steering. Truck travels up to 5.5 m.p.h.—3 speeds forward, 3 reverse.

Other features include new single-package gear drive, easily accessible and easily removable. Added safety with dead-man-type brake. Also available with triple telescopic masts. Write for Model RST Bulletin 598 for complete details and prices.

BARRETT

BARRETT-CRAVENS COMPANY • 614 Dundee Road • Northbrook, Illinois

FIRST WITH AUTOMATED MATERIALS HANDLING

Circle **14** on Reader Service Card

ASSOCIATIONS

MHEDA "Metal Finishing & Forming Material Handling" is the subject of the MHEDA National Material Handling Center's course for the week of April 17. Two courses are scheduled for May. "Brewery & Distribution Warehouse Material Handling" will be given the week of May 8. "Food Canning & Processing Material Handling" is set for the week of May 22.

National convention of the Material Handling Equipment Distributors Association is scheduled for June 1-3 at the Denver Hilton, Denver, Colo. Chairman of the 1961 convention is Jack D. Patten. Among the speakers: Calvin D. Johnson, special consultant on public affairs of the American Trucking Association; H. Merrill Bowman, vice president, T. B. Wood's Sons Company; Leonard M. Wasserbly of Industrial Distributor News; and Robert F. (Bob) Moody, president, Material Handling Institute, and vice president of Hyster Co. Theme of the convention: "Better Methods For Profit."

A special five-day course on Material Handling for the Food Processing and Canning Industry will be held May 22-26 at the MHEDA National Material Handling Training Center, Newport, R.I. Theme of the 1961 MHEDA National convention June 1-3 at the Denver Hilton hotel, Denver, Colo. is "Better Methods For Profit." Jack D. Patten is chairman. This is the 7th annual convention.

PCSA Lewis C. Black, vice president of Bucyrus-Erie Co., South Milwaukee, was elected 1961 president of the Power Crane & Shovel Association at its annual meeting in Chicago. Other officers are: Hugh B. Halloran, crane sales manager, Manitowoc Engineering Corp., vice president; Herbert S. Blake, Jr., secretary; and Donald V. Reed, treasurer. Blake and Reed are both of the Organization Service Corp., NYC.

FBA Jerome H. Stone, president, Fibre Box Association and executive vice president, Stone Container Corp. attended an international conference of corrugated box manufacturers in Paris, France in March. Albert W. Luhrs, executive manager, FBA, accompanied Mr. Stone. Purpose of the meeting was to establish an international association of corrugated box companies.

SPHE Missouri Chapter of the Society of Packaging and Handling Engineers at its March meeting heard G. T. Connors of the Weyerhaeuser Co. His topic: "Why Advertise Industrial Packaging?"

Eastern Chapter's March meeting covered the position of the packaging engineer and director in most companies today. Main speaker: Melvin Mandell, industrial editor of Dunn's Review and Modern Industry. He told what packaging people can do to improve their positions and the operation of their department. At the April meeting, joint with the Packaging Institute, the group was addressed by Richard J. Hennessy. Hennessy is head of packaging development, Lederle Laboratories, a Division of American Cyanamid Co. His subject: "Specifications, Testing, and Control of Packaging Materials."

Northeastern Ohio Chapter of SPHE recently held a joint meeting with the Cleveland Chapter of the American Material Handling Society. The group toured the Western Electric Co. at Solon, Ohio.

Chicago headquarters has mailed letter ballots for member voting on a Junior Membership Classification in SPHE constitution and by-laws. Plans call for junior members to be at least 18 years of age, and not older than 25. They are to be sponsored by a professional member.

AMHS Denver Chapter of the American Material Handling Society, Inc. at its March meeting heard M. A. Travis of Los Angeles speak on "Material Handling Is Everyone's Business." Travis is new systems division manager of Green Penney Co. The chapter at its April meeting heard Jack D. Peters speak on conveyors. Peters is vice president and general manager of the Jervis B. Webb Co. of California. He showed two films on how to mechanize warehouses.

Houston Chapter recently held a joint meeting with the Industrial Engineering Society. C. L. Lloyd of Sheffield Division, Armco Steel Corp. spoke on "The Profession of Management."

Narragansett Chapter was recently addressed by R. T. Olsen of the General Electric Co. He is supervisor of manufacturing methods at Hudson Falls, N.Y. GE Branch.

Indianapolis Chapter's March meeting covered the "Stacker Crane." Speaker: Sherman Fountain, vice president of the Chicago Tramrail Corp. New members of this chapter are: J. M. Palmer, Allison Division, General Motors Corp.; C. R. Lenglade, Reid-Holcomb Co.; and N. D. Smith, Riegel Paper Corp.

Minnesota Chapter recently made a tour of the Nutting Truck & Caster Co. at Faribault, Minn.

FPBA A new edition of The Folding Carton, an illustrated booklet used in packaging, is now being distributed by the Folding Paper Box Association of America. Contains an extensive glossary of terms used in the manufacture of folding cartons. Also included are diagrams of the most popular carton styles, complete descriptions of the manufacture and use of cartons, and instructions for ordering.

PMMI "Planned Maintenance: The Profit Tool of Modern Management" is the general theme of a Conference-Workshop that the

Packaging Machinery Manufacturers Institute, Inc. will conduct in Detroit's Cobo Hall Nov. 8-9. These preventive maintenance forums will be held along with the PMMI Show of 1961 Nov. 7-10. Richard Wellbrock is chairman of the committee on technical sessions. Wellbrock is vice president—sales, of the New Jersey Machine Corp., Hoboken.

NWPMA The 15th annual meeting of the National Wooden Pallet Manufacturers Association will be held at the Chateau Lake Louise in Lake Louise, Alberta, Canada July 2-4. About 100 persons from the United States and Canada are expected to attend.

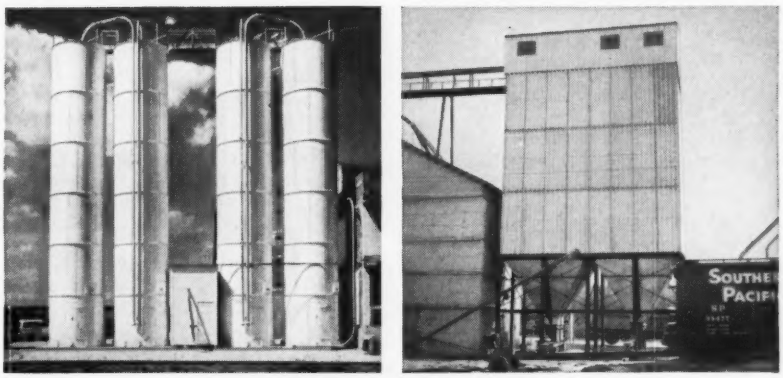
HMA Fourth of a series of hoist specifications prepared by The Hoist Manufacturers Association is now available. You can get "HMA-400 Standard Specifications for Electric Chain Hoists" from HMA members or from the Association offices at One Thomas Circle, Washington 5, D. C.

NPA Winthrop Endicott, sales manager, Carolina Division, Riegel Paper Corp., has been elected a director of National Paperboard Association.

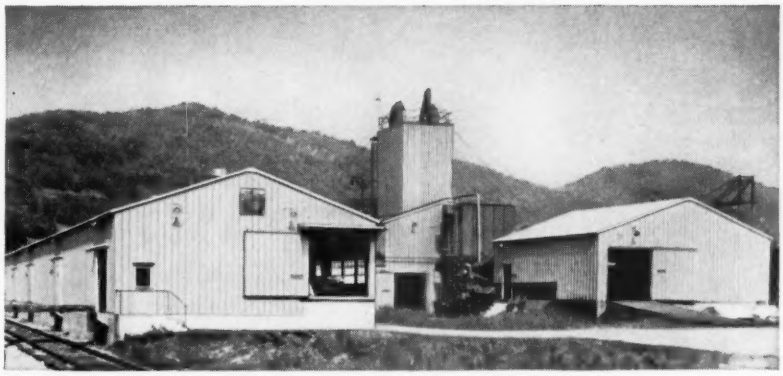
MHI Newest member-company of The Material Handling Institute, Inc. is The Divine Brothers Co. Donald A. Miner represents the company in the affairs of the Institute.

PSTC The Pressure Sensitive Tape Council now has a program to supply on a cost basis specialized testing equipment for use in testing pressure sensitive tapes. The equipment conforms to ASTM and Federal Specifications, and of course, to all PSTC test methods. Test units may be obtained from the Tape Council's offices, 1201 Waukegan Road, Glenview, Ill. The equipment includes: cut-off jig, water vapor transmission cup, 4½ lb. rubber roller, adhesion test panels, an unwind adhesion jig, and a Quick Stick test jig.

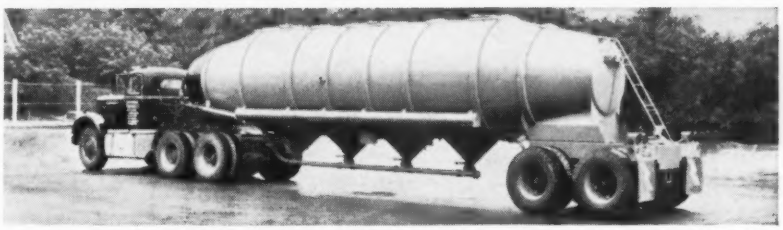
The smart way to go bulk



BUTLER TANKS



BUTLER BUILDINGS



BUTLER TRANSPORTS

Planning and erecting bulk facilities the traditional way can be a costly investment in time and capital. The economical way to go bulk is with Butler.

Pre-engineered Butler tanks and buildings can be ordered from stock. Routine engineering and costly custom fabrication are eliminated. Bolt-together assembly speeds erection. Rugged construction cuts maintenance and insurance costs.

The tanks can be furnished in sizes to fit any space or volume need. Butler buildings, in clear-span sizes up to 120' wide, are available with metal cover panels in natural finish or attractive, factory-applied colors. Butler's pneumatic unloading trailers will handle maximum payloads of almost any dry flowable easily and economically. Liquid trailers are also available.

Whatever your bulk storage and handling needs, Butler has the smart solution to your problem. Write for details.

CELEBRATING 60 YEARS BUTLER FABRICATING METALS

BUTLER MANUFACTURING COMPANY

Industrial Bulk Sales Division

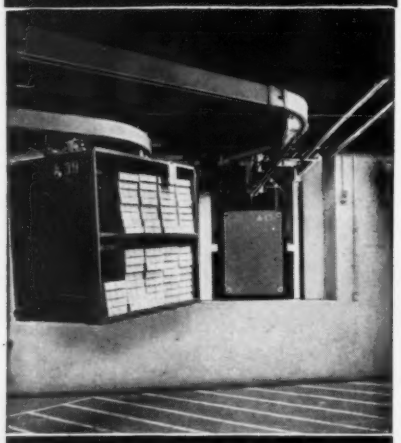
7370 EAST 13TH STREET, KANSAS CITY 26, MISSOURI

In Canada contact Butler Manufacturing Company (Canada) Ltd., 3455 Queen Elizabeth Way, Burlington, Ontario

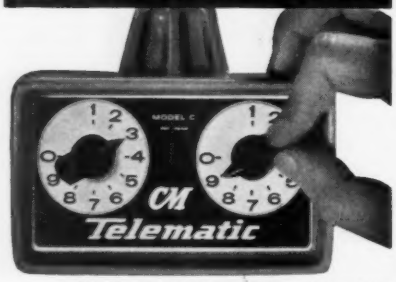
Circle **12** on Reader Service Card

Power -Flex®

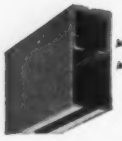
POWER AND FREE
OVERHEAD CONVEYOR SYSTEM*



WITH TELEMATIC
AUTOMATIC DISPATCH CONTROL



• *Simply set dials and Telematic guides carrier to any station in system*



POWER RAIL
FREE RAIL

Employs exclusive unitized "over and under" power and free rail which permits simple switching to right or left as desired.

Power-Flex is designed for automated materials forwarding applications in industrial plants, distribution centers, service buildings and department stores. The most economical system available for loads up to 600 lbs. per carrier. Savings in actual installations range from 25% to 60%.

*Systems in service for your inspection.

Engineered to your very specific requirements.

SEND FOR BROCHURE

Inquiries from your engineers or consultants welcomed.

CM CONVEYORS

COLUMBUS McKINNON CORPORATION
Conveyor Division
TONAWANDA, N. Y.

Circle 33 on Reader Service Card

mhe INDUSTRY NEWS

Elwell-Parker Promotes Towson and Meddick

Sheldon K. Towson, Jr. has been elected president and chief executive officer of The Elwell-Parker Electric Co. W. A. Meddick has been promoted to the post of chairman of the board.

Towson

Meddick

Towson until now served as vice president and general manager. He joined the company in 1956 as assistant to the president. He was named to the vice president post in 1958.

Meddick, a 25-year veteran of Elwell-Parker, was named president in 1958 following the death of S. K. Towson, Sr. He had formerly served the company as vice president.

Exide Promotes Mustard To National Marketing

James A. Mustard, Jr. has been named assistant to C. J. Moore, vice president—marketing for The Electric Storage Battery Co.'s new Exide Industrial Marketing Division.

Mustard, who was general sales manager of the Nickel-Alkaline Division, will headquarter in Philadelphia. He has 24 years' experience in the battery business.

Minneapolis-Moline Changes Name

Motec Industries is the new name for Minneapolis-Moline, approved at the annual meeting so "the name will reflect the company's diverisfied activities."

The Farm Equipment Division, however, will continue to use Minneapolis-Moline. Divisions under Motec include: Mobilift Materials Handling Equipment; Mopower Construction Equipment; Molectronics; Mohawk Foundry & Forge; Moline Automotive; Motec Engineering; Motec International; Mocraft Power Tool; and Pioneer Equipment Finance Co.

Ready-Power Co. Names Two Vice Presidents

Reuben W. Pelto and Norbert K. Hall have been appointed vice presidents of The Ready-Power Co., Detroit.

Pelto becomes vice president and manager, Truck Unit Sales. He has been with the company since 1924.

Hall, who was named vice president and manager Air Conditioning, has been with the company since 1950.

Clark Appoints Sales Manager

C. W. Bent has been appointed product sales manager of attachments and container handling equipment for the Industrial Truck Division, Clark Equipment Co.

Bent has been with the company since 1947. When Clark entered the containerization field in 1954, Bent was appointed product manager of the Mobilvan Division. Prior to this new appointment, he was product manager of container handling devices.

Allis-Chalmers Establishes Philadelphia Retail Branch

R. M. Scott, Jr. has been named branch manager of the newly formed Philadelphia Retail Branch of the Allis-Chalmers Engine-Material Handling Division.

The new branch serves the Delaware Valley area which consists of five counties in Pennsylvania, eight in New Jersey, and two in Delaware. Scott has been in the material handling field all of his business career.

Staff-Board Changes at Stephens-Adamson

L. S. Stephens, president of Stephens-Adamson Mfg. Co. since 1934,

has been appointed chairman of the board. Donald L. Stephens, executive vice president, assumes the role of president vacated by his father.

E. J. Renner, a vice president of the firm, was elected to the board of

L. S. Stephens

D. L. Stephens

directors. R. W. Barton, a member of the board, was elected to a vice presidency. R. H. Humm, manager of the Standard Products Division of the company, and D. R. Dolan, plant manager, were elected to newly created vice presidencies, and James W. Cadwell was elected secretary. All changes were made at the recent annual stockholder's and board of directors meeting.

Atlas Appoints General Manager

Harold Birndorf has been appointed general manager of Atlas Lift Truck Rentals & Sales, Inc. He has been with the company 4 years.

Waddock Elected VP-Sales at Clark-Aiken Company

John J. Waddock has been elected vice president in charge of sales at the Clark-Aiken Co. For the last 5 years, he was sales manager.

Waddock joined Clark-Aiken at the completion of his army service in 1946. He advanced from shop production work to purchasing agent in 1951, and then to the sales department.

Flo-Tronics Expands

Flo-Tronics, Inc., Minneapolis manufacturer of electronic controls and material handling systems, has purchased the Atkinson Bulk Transport Co., Minneapolis. This makes four local firms bought by Flo-Tronics since July, 1960.

Hewitt-Robins Names Manager

J. W. Anderson has been appointed manager of the Power Transmission Sales Department of Hewitt-Robins, Inc. He has more than 25 years' experience in the power transmission field. Since 1955, he was in charge of sales of the company's Union Chain Division at Sandusky, Ohio. He will locate now at the company's executive offices, Stamford, Conn.

Cushman Motors Receives $1 Million Order

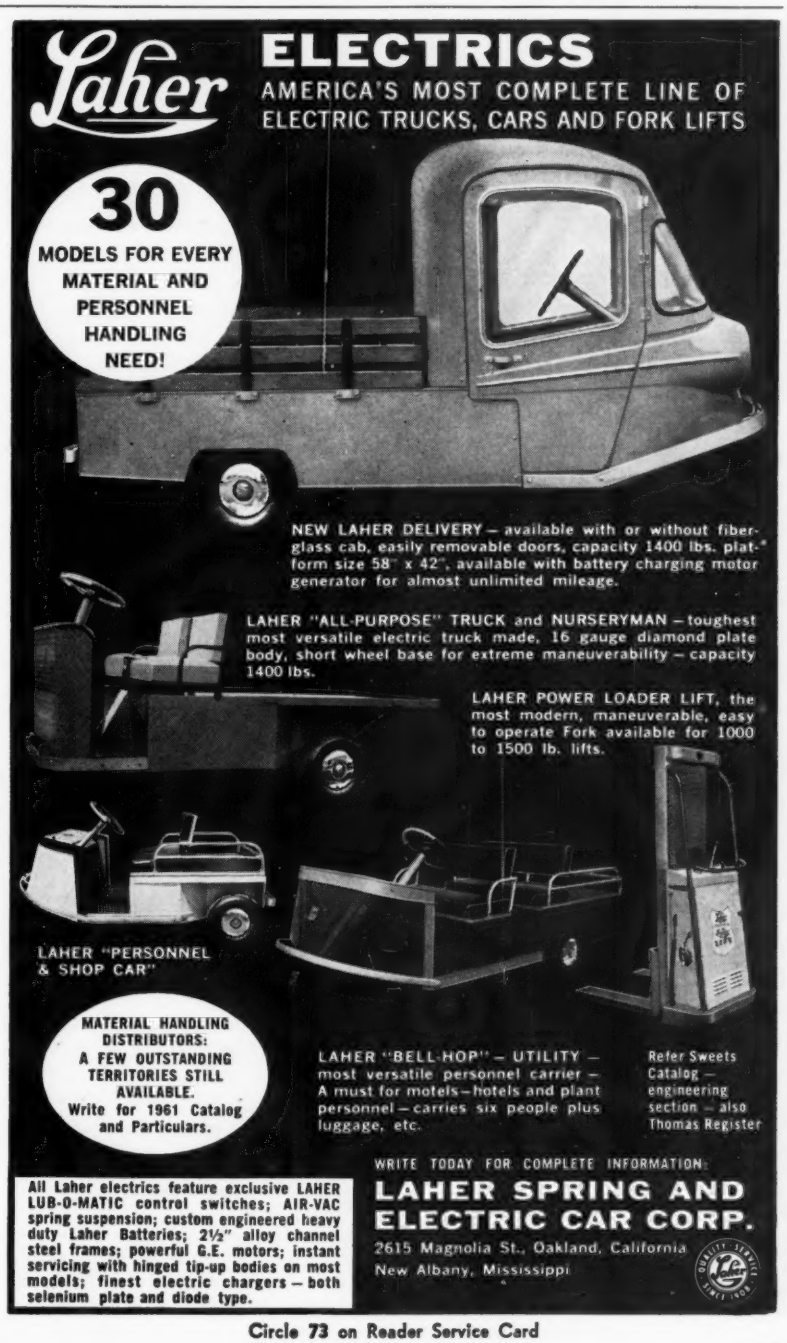
Cushman Motors has been awarded a $1,063,200 contract to supply the US Post Office Dept. with 1,200 Cushman Mailsters. The contract was based on competitive bidding.

The Mailster is a 3-wheel vehicle developed by Cushman in conjunction with US Post Office Dept. engineers. They're used for delivering mail to large suburban and rural routes.

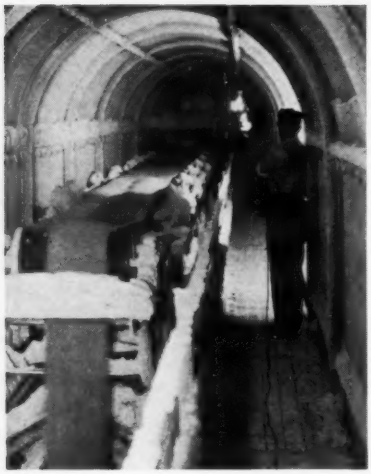
H. M. Ross Elected VP of Hewitt-Robins, Inc.

Hamilton M. Ross has been elected a vice president of Hewitt-Robins Incorporated. His responsibility is for contract engineering operations.

Ross will be assisted by Martin Vander Laan. He has been appointed director of engineering sales with


Laher
ELECTRICS
AMERICA'S MOST COMPLETE LINE OF ELECTRIC TRUCKS, CARS AND FORK LIFTS
30
MODELS FOR EVERY MATERIAL AND PERSONNEL HANDLING NEED!
NEW LAHER DELIVERY – available with or without fiberglass cab, easily removable doors, capacity 1400 lbs. platform size 58" x 42", available with battery charging motor generator for almost unlimited mileage.
LAHER "ALL-PURPOSE" TRUCK and NURSERYMAN – toughest most versatile electric truck made, 16 gauge diamond plate body, short wheel base for extreme maneuverability – capacity 1400 lbs.
LAHER POWER LOADER LIFT, the most modern, maneuverable, easy to operate Fork available for 1000 to 1500 lb. lifts.
LAHER "PERSONNEL & SHOP CAR"
MATERIAL HANDLING DISTRIBUTORS: A FEW OUTSTANDING TERRITORIES STILL AVAILABLE. Write for 1961 Catalog and Particulars.
LAHER "BELL-HOP" – UTILITY – most versatile personnel carrier – A must for motels–hotels and plant personnel – carries six people plus luggage, etc.
Refer Sweets Catalog – engineering section – also Thomas Register
All Laher electrics feature exclusive LAHER LUB-O-MATIC control switches; AIR-VAC spring suspension; custom engineered heavy duty Laher Batteries; 2½" alloy channel steel frames; powerful G.E. motors; instant servicing with hinged tip-up bodies on most models; finest electric chargers – both selenium plate and diode type.
WRITE TODAY FOR COMPLETE INFORMATION:
LAHER SPRING AND ELECTRIC CAR CORP.
2615 Magnolia St., Oakland, California
New Albany, Mississippi

Circle 73 on Reader Service Card



Sticky bulk materials no problem with JOY Limberollers®

Every time a Joy Limberoller belt conveyor idler turns, it flexes and cleans itself. Even the stickiest of materials like triple super phosphate never have a chance to build up and harden.

This unique flexing cleaning action is a result of the Limberoller's design. Essentially, it is a neoprene covered flexible steel wire cable. Neoprene discs are molded to the cable. The ends of the cable are swedged into bearings held in a swiveling mount. Suspended between the two bearings, the Limberoller assumes a natural catenary. This curve causes the flexing with each rotation of the idler, keeping it free of any material buildup.

If you are handling materials that are sticky, abrasive or corrosive the Limberoller can solve your problems. They can be easily mounted on your present conveyor. For more information, write for bulletin 2758-90.

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Circle 68 on Reader Service Card

INDUSTRY NEWS

responsibility for world-wide sales of bulk material handling systems.

Succeeding Ross as manager of the Robins Conveyors Division is Norman M. Godfrey. Godfrey had been manager of the company's Eastern sales region.

Hyster Co. Names Two Vice Presidents

Glenn Herz and James L. Woodley have been elected vice presidents of Hyster Co.

Herz was named vice president—engineering; and Woodley became vice president—manufacturing.

Herz

Woodley

Herz has been with the company 15 years. He served as chief engineer since 1958. He is a well-known engineer in the heavy machinery industry.

Woodley joined Hyster in 1945. His most recent post was manager—manufacturing. Both men are located at the company's general office in Portland, Oregon.

Lanphier Elected President of Fairbanks, Morse Co.

Thomas G. Lanphier, Jr. has been elected president of Fairbanks, Morse & Co. He has been with Fairbanks Whitney Corp., parent company of Fairbanks, Morse, since Sept. 1, 1960, as vice president—planning. He will continue in that capacity along with his new duties.

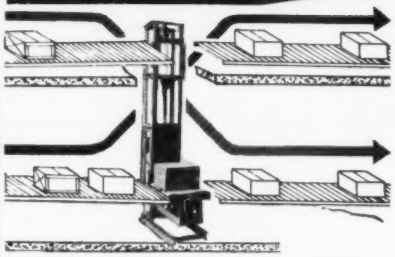
Prior to his association with Fairbanks Whitney, Lanphier served 10 years as vice president and assistant to the president of the Convair Division of General Dynamics Corp.

Austin-Western Names District Sales Managers

Three district sales managers have been named by Austin-Western, Construction Equipment Division, Baldwin-Lima-Hamilton Corp.

Circle 115 on Reader Service Card

DOUBLE your floor-to-floor Traffic with Weld-Bilt "Criss-Cross" Automatic Lift Unit



This *single* Weld-Bilt Automatic Conveyor-Lift Elevator—plus two powered Feed Conveyors and Discharge Conveyors—handles, automatically, a greater capacity than two ordinary freight elevators and at much lower cost! Automatic "memory" controls do all the work. Easily adapted to completely automatic conveyorized feed, with synchronized loading and discharge. Get the whole story now. Write for bulletin E-557.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

335 Water Street • West Bend, Wisconsin

AT LAST!

AN AUTOMATIC BATTERY RECHARGER!

LaMarche Recharjer

- Increases Battery Life
- Lowers Maintenance Cost
- Saves Space
- No Moving Parts — *IT'S FULLY AUTOMATIC!*

A completely new concept in battery recharging, developed by the pioneer of Silicon self-regulating battery chargers. Units can be mounted on *wall, floor, or truck.* Over 70 standard models to choose from. More than 18,000 units in use today!

Guaranteed for one full year by:

LaMarche Mfg. Co., Inc.
3955 25th Ave. Schiller Park, Ill.
GLadstone 5-8855

Circle 70 on Reader Service Card

Henry W. Ludwig will supervise sales in Minnesota and North and South Dakota; Harold J. Feekays, in Tennessee, Arkansas, Mississippi, and Louisiana; and B. Alton Wolfe in Ohio, Indiana, and Michigan.

Hough Co. Appointments

Jules C. Laegeler has been named vice president in charge of engineering for The Frank G. Hough Co. Laegeler, who formerly held the position of chief engineer, has been with the company since 1951.

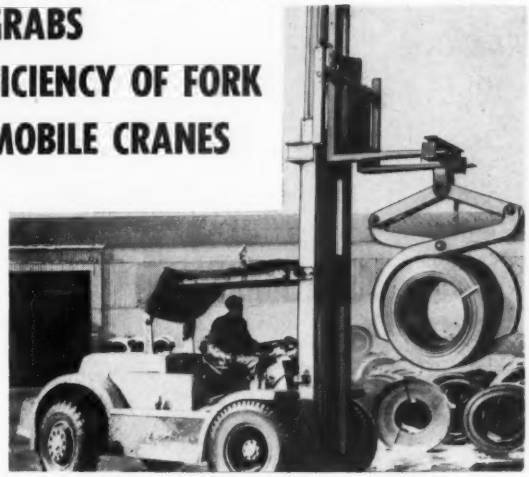
In other company changes, Keith W. Kamper has been appointed chief engineer, product design; and Thorvald Granryd, chief engineer, research and development. Kampert was formerly assistant chief engineer, and Granryd, former manager of product improvement.

Cooper Elected Diamond Chain VP

Jack E. Cooper has been elected vice president of Diamond Chain Co., Inc., Indianapolis. Cooper joined Diamond Chain in 1951. He had been

Circle 78 on Reader Service Card

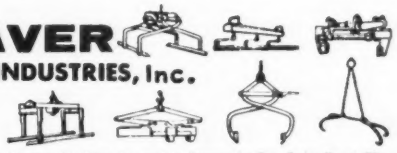
MANSAVER GRABS INCREASE EFFICIENCY OF FORK TRUCKS and MOBILE CRANES



Here is another example of how the proper use of material handling equipment saves time and labor and increases efficiency. This Mansaver style 1527 coil Grab is fully automatic enabling the truck operator to handle coils without leaving the driver's seat! The grab handles out of round as well as round coils.

Send for Mansaver Grab Preview Bulletin, Form 1363.

MANSAVER INDUSTRIES, Inc.
3103 East St.,
New Haven, Conn.

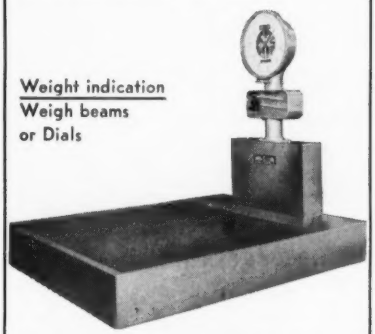


Also Manufactured in England by George W. King Co. and in France by Ets. Dujardin et Cie.

Winslow

COST SAVING ACCURATE WEIGHING INDUSTRIAL OR WAREHOUSE SCALES

Weight indication
Weigh beams
or Dials



Modern Self-Contained Design Installs in Shallow Pit or on Floor Surface.

Wide Range of Capacities and Platforms Available to Meet Most Any Weighing Requirement.

Write or Phone Dept. B115 Today
Phone NORTH 1231

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.
25TH & HAYTHORNE TERRE HAUTE, IND.

Circle 116 on Reader Service Card

ON-TIME maintenance cuts down-time *DOWN*

Hobbs

INDUSTRIAL HOUR METERS

For use with gasoline, electric and diesel powered equipment

PLANNED MAINTENANCE based on actual hours of use is the answer to more GO-time and less DOWN-time on your equipment!

TRUE RUNNING TIME gives you a realistic basis for renting and leasing, service contracts, buying and selling.

HOBBS electrical timing instruments are the basic source for the facts you need — revolution counters cannot do the job. Distributors in principal cities . . . WRITE FOR CATALOG 600.

John W. Hobbs Corporation
A DIVISION OF STEWART-WARNER CORPORATION
2061 YALE BLVD. SPRINGFIELD, ILLINOIS

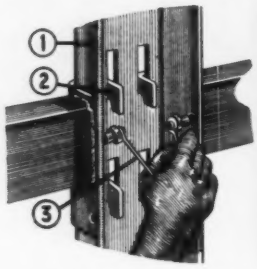
Symbol of SW Excellence

Circle 61 on Reader Service Card

Circle 56 on Reader Service Card

Ridg-U-rak®
PATENTS PENDING

FASTEST WAY TO CONVERT
AIR SPACE INTO EFFICIENT STORAGE SPACE



Every Ridg-U-rak Connection Locked 3 Ways

(1) Full length external column flange stops *side* movement

(2) Double engaging hooks in slots stop *down* movement

(3) Spring Steel Pinch Pins stop *vertical* movement

Plant Engineers will appreciate the adaptability and sturdiness of Ridg-U-rak storage systems—the simplicity that speeds erection or disassembly—the ease of Beam adjustment. The Ridg-U-rak patented connection is a big advance over BG's pioneering double hook and slot design. Only two basic parts, the Upright Frame with its external column flanges and the Beam with its integral double hook pads are engineered into Ridg-U-rak Systems to meet storage needs.

For a description of Ridg-U-raks, write for Catalog 107-E

BERNARD GLOEKLER NORTH EAST CO.
NORTH EAST, PA.

INDUSTRY NEWS

manager of sales since October, 1959. The company is a subsidiary of American Steel Foundries, Chicago.

Yale & Towne Names Marketing Service Director

Robert M. O'Donnell has been appointed to the newly created corporate staff position of director of marketing services at Yale & Towne Mfg. Co.

O'Donnell

O'Donnell will serve in the new capacity, along with his regular work as corporate secretary. In his new position, he will direct and administer the corporate services available to the operating divisions and corporate offices. This includes marketing, advertising, market planning and research, and sales coordination. O'Donnell joined Y & T in 1958 as a marketing specialist.

Bostitch Plans New Wire Mill In Connecticut

Universal Wire Company, a sub-

Make light of any load with

ELECTROLIFT
WORM-DRIVE HOISTS

Safe . . . sure . . . swift . . . ElectroLift worm-drive hoists have a place in every manufacturing plant, large or small. Ranging from ¼ to 10 tons in capacity, these units feature:

- Safe, sure braking and quiet, durable worm-gear drive.
- Totally enclosed gearing with ac or dc motor drive.
- Compact design for operation in close headroom.
- Quality construction and material for long, trouble-free performance.

For details on speeds, capacities, models and operation, consult the classified directory for the ElectroLift representative nearest you.

7990

ELECTROLIFT

204 Sargeant Avenue Clifton, N. J.

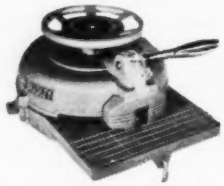
Circle 43 on Reader Service Card

YOUR GOOD PRODUCT DESERVES TO BE SHIPPED with THE PROPER MARK

MARKING RULE 6 says: freight must be stenciled or otherwise durably and plainly marked.

DURABLY means in a durable manner; lasting in spite of hard wear or frequent use. (You get durability with D-B ROL-IT-ON stencil inks.)

PLAINLY means easy to read. The marking should be as large as possible. (There is a D-B stencil machine in a letter size to meet your every marking need.)



FOR FURTHER INFORMATION WRITE . . .

DIAGRAPH-BRADLEY INDUSTRIES Inc.
P. O. BOX 269 HERRIN, ILLINOIS
DISTRIBUTORS IN ALL PRINCIPAL CITIES
D-B

Circle 39 on Reader Service Card

sidiary of Bostitch, Inc., has purchased 41 acres in Clinton, Conn., for the site of a modern wire mill.

The new plant will be 100,000 sq. ft. and will produce part of the Bostitch requirements of stapling wire and attaching wire. The company is presently located in Stamford, Conn.

CLASSIFIED ADVERTISING

Rates: Cost of all ads in this section is $20 for the first inch and $15 for each additional inch or fraction. Rates for display ads in this section will be sent on request. All classified advertising is payable in advance.

SALES ENGINEER

We are looking for an experienced sales engineer to handle customer liaison on automatic warehouses and engineered conveyor systems. By experience we mean at least 5 or 6 years of actual field work, and we would like to know what your specific accomplishments were during that period. You will function as project sales engineer and, depending on the nature of the job, will have major responsibility for analysis of the custom-

Continued on next page

Circle 9 on Reader Service Card

IT'S FAST
IT'S ECONOMICAL
IT'S PORTABLE

BAUGHMAN MODEL Q-51
SCREW CONVEYOR

This maneuverable screw conveyor by Baughman moves 25% more volume of materials that roll or become fluid in motion. No rollback. 9" screw actually pumps material through round casting. Available in lengths from 10' to 50', with edectric or gasoline motor. 50' model can be elevated to height of 26'. Also available in stationary models. Optional accessories include detachable hopper with legs, and undertrack unloader.

For Complete Information Write for Bulletin A-405

A few choice distributorships available

BAUGHMAN TRANSPORTS · SPREADERS · CONVEYORS

BAUGHMAN MANUFACTURING CO., INC.
315 SHIPMAN ROAD • JERSEYVILLE, ILLINOIS

6124

IMPACT-O-GRAPH KNOWS...
IMPACT-O-GRAPH SHOWS...
The Time and Severity of "In Transit" BLOWS!

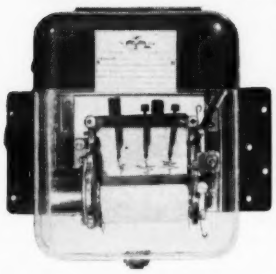
Literally millions of dollars are wasted each year in needless damage to goods in shipment. And most of this damage comes from unknown causes.

IMPACT-O-GRAPH'S job is to track down the cause of damage and supply the information to change packaging or shipping methods if necessary. IMPACT-O-GRAPH is also widely used to test the ability of products to stand up under the shocks or impacts encountered in their use.

Many models are available with a wide choice of "g" ratings for use either in a package with a product or attached to the carrier.

Send today for the new brochure giving the specifications on different IMPACT-O-GRAPH models...their operation and uses.

The IMPACT-O-GRAPH is National Safe Transit approved. Leasing arrangements are available.



Model Hc and Hm

THE IMPACT-O-GRAPH® CORPORATION
B. F. KEITH BUILDING • CLEVELAND 15, OHIO • CHerry 1-5838

Circle 67 on Reader Service Card

new
Versatile
22 x 14 x 5

PATENTED
2,823,828
2,823,829

Stack-n-Nest®
TOTE PAN

This new Lewis Stack-n-Nest tote pan has been designed to work in conjunction with the popular 22 x 14 x 8 size. Pans will interstack and internest. Covers and dollies can also be utilized as shown.

22 x 14 COVER
22 x 14 x 5 PAN
22 x 14 x 8 PAN
22 x 14 DOLLY

Molded in one-piece of Fiberglass reinforced polyester, these pans stack and nest within their own dimension, without mechanical gadgets. Can't rust, rot, corrode . . . exceptionally strong. Available in 9 sizes. Covers and dollies for several sizes available.

SHIPMENT WITHIN 24 HOURS FROM RECEIPT OF ORDER

Write today for illustrated brochure and prices.

G.B. Lewis COMPANY
605 Montgomery Street, Watertown, Wisconsin

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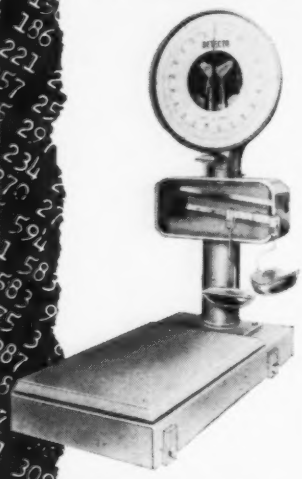
Circle **38** on Reader Service Card

Count 2,000 2 oz. pieces in less than one minute with a

DETECTO
COUNTING SCALE



DETECTO SCALES, INC.
Dept. MH-8
540 Park Ave., Brooklyn 5, N.Y.

Circle **66** on Reader Service Card

PAY NO MORE

BT PALLET TRUCKS

HEAVY DUTY ALL HYDRAULIC

NOW ONLY $350.00 F.O.B. Chicago

- Lowered Height 3¼"
- 90° PIVOT—2-Ways
- Lift 5"—SKF Bearings
- For Single or Double Face Pallets & Skids

YOUR CHOICE of sizes in either model:

Widths: 20½" or 27"
Lengths: 36", 42" or 48"
Wheels: Steel, Rubber or Bakelite (at no extra cost).
Specify Model No., Fork width and length and type of wheels wanted.

BT-24—2400 lb. Cap.....**$350.00**
BT-44—4400 lb. Cap.....**$395.00**

WRITE—WIRE—PHONE Dealer Inquiries Invited

INDUSTRIAL HDLG. EQUIP. CO.
1229-31 W. Monroe St., Chicago, Ill.
Phone MOnroe 6-8554

CLASSIFIED ADVERTISING

er's problem, planning the overall system, following work through engineering, fabrication and erection, as well as handling all details at the customer's end. To a great extent we expect you to be your own manager, plan your own activities and function with a minimum of supervision. You will be backed by the engineering team that has designed and built the most advanced package handling systems in the world. Please write directly to Norman M. Sullivan, Sales Manager.

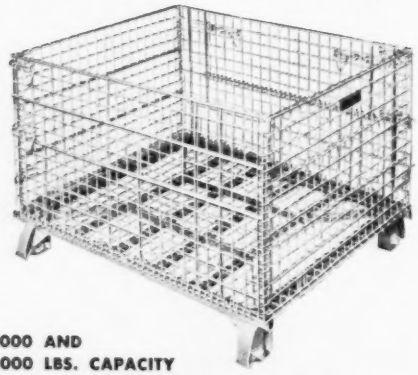
The Alvey-Ferguson Company
Cincinnati 9, Ohio
Phone REdwood 1-7000

HELP WANTED

Samuel Olson Mfg. Co., Chicago, Illinois, has attractive opening for experienced estimator to assume charge of estimating department. Good salary and excellent opportunity for advancement in growing organization. Write Samuel Olson Mfg. Co., Inc., 2418 Bloomingdale Ave., Chicago, Illinois.

WIRE-TAINERS

Save Costs, Time and Space



2,000 AND
4,000 LBS. CAPACITY
WITH VISIBLE INVENTORY AT ALL TIMES

WIRE-TAINERS are the economical way to handle materials in production, storage, or transit. Available in a wide variety of models and sizes for efficient, economical service. 2 x 2 electro-welded steel wire mesh with a dipped aluminum finish. WIRE-TAINERS stack or fold to save floor space and are engineered to withstand hard usage.

SPRINGPORT STEEL Products Co.
03 **SPRINGPORT, MICHIGAN**

MEMBER MHI

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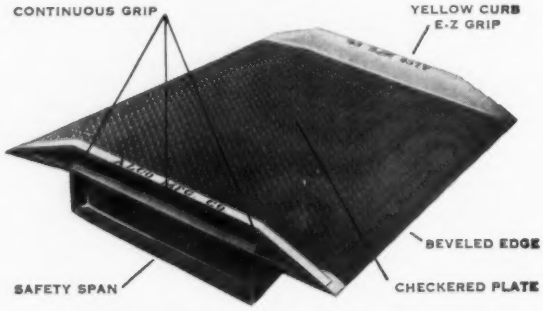
magcoa

THE OLDEST NAME IN

LIGHTWEIGHT MAGNESIUM DOCKBOARDS



A Magcoa dockboard on your dock is a mark of quality. It is designed to fit *your* loading problems — not a standard that is *almost* right.

The new E-Z Grip continuous one-piece extruded Safety Curbs provide the strongest, safest guard rails you can have on your dockboards. Truck or rail — with Magcoa you have the best.

MAGNESIUM COMPANY OF AMERICA
Dept. 501, 155 S. E. 10th Avenue
Hialeah, Florida
TUxedo 7-8117

Circle **83** on Reader Service Card

WAREHOUSE SUPERINTENDENT

To direct warehousing operations of a major paper converter. Modern warehouse. Plant in northeastern United States. All replies confidential. Forward resume and salary required. Write MATERIAL HANDLING ENGINEERING, Box 5361.

USED SKIDS FOR SALE

Approximately 500 high skids 32″ x 48″ for 11½″ high skid truck. Approximately 1,500 nesting skid rings 12″ high also available. For details contact Square D Co., Peru, Indiana.

LINES WANTED

Aggressive representative for nationally known crane and hoist manufacturer covering Cincinnati, Ohio and 150 mile radius. Needs companion line for sales and service. Write MATERIAL HANDLING ENGINEERING, Box 5161.

MACHINERY AND EQUIPMENT FOR SALE

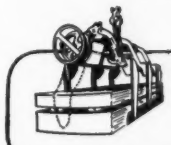
Five stainless steel mesh conveyors 39′ x 32″–25′ x 32″–8′ x 42″–5′ x 42″–5′ x 42″. One belt conveyor–18′ x 80″. Write Box 5261, MATERIAL HANDLING ENGINEERING.

Circle 31 on Reader Service Card

1 man ...handles Sheet Steel Faster, Easier with a C-F LIFTER

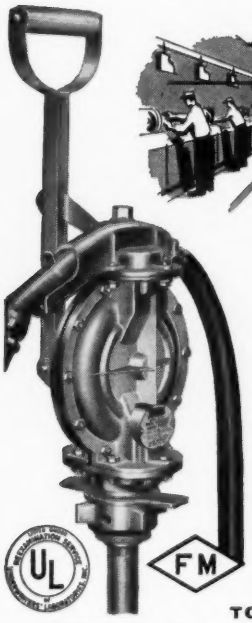
C-F Lifters, under one man operation, pick up, carry and unload more sheet steel tonnage per hour than any other method – and at lower cost per ton. Wide carrying angles hold sheets securely – won't damage high grade sheets; tong action insures safe carrying; fast opening and closing adjustments of Lifter jaws permit shifting from one size pack to another in seconds. C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons.

Write for Bulletin SL-30 for specific examples of C-F Lifter operation and economy.



CULLEN-FRIESTEDT CO.
1320 SOUTH KILBOURN AVENUE • CHICAGO 23, ILLINOIS

SAFER HANDLING of INDUSTRIAL LIQUIDS!



Eliminate in-plant accidents caused by slick floors and spilled inflammables! This TOKHEIM Hand Pump, for use on drums or skid-tanks, has 8′ hose—or spout outlet—prevents dangerous, wasteful slopping of oils and many other liquids. Speeds production. Pumps 20 gallons per 100 strokes. Ask your dealer, your Tokheim representative or write for list of liquids.

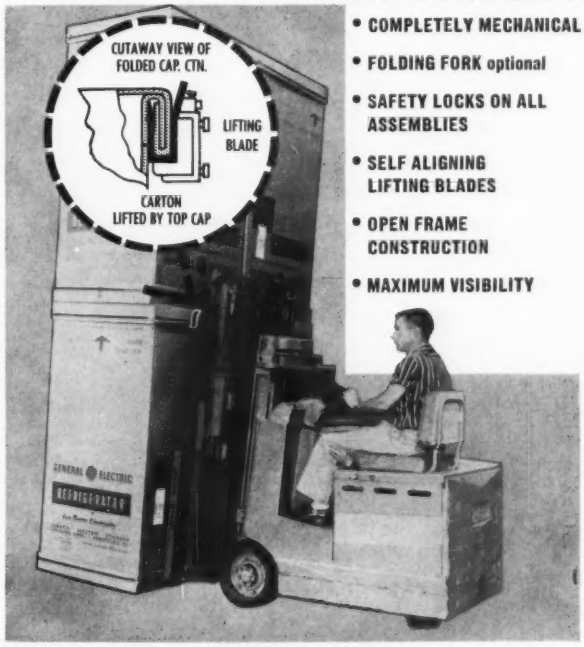
TOKHEIM HAND PUMPS

General Products Division
TOKHEIM CORPORATION
DESIGNERS AND BUILDERS OF SUPERIOR EQUIPMENT SINCE 1901
1668 Wabash Avenue Fort Wayne 1, Ind.

Subsidiaries: Tokheim International, A.G., Lucerne, Switzerland; GenPro Inc., Shelbyville, Indiana; Tokheim of Canada, Ltd., Toronto, Ontario

Circle 105 on Reader Service Card

Lift-a-Pliance LIFT-TRUCK ATTACHMENT



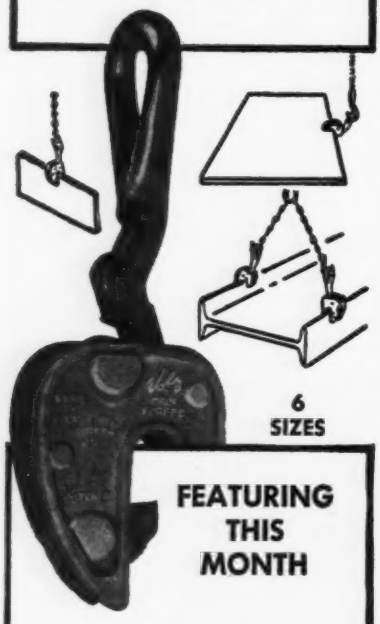
- COMPLETELY MECHANICAL
- FOLDING FORK optional
- SAFETY LOCKS ON ALL ASSEMBLIES
- SELF ALIGNING LIFTING BLADES
- OPEN FRAME CONSTRUCTION
- MAXIMUM VISIBILITY

BASILOID PRODUCTS CORPORATION | ELNORA INDIANA

Circle 8 on Reader Service Card

YOUR BEST MOVE . . . MOVE
with **MERRILL**
MATERIAL HANDLING
DEVICES FOR THE MOST
IN *Safety and Economy*

Imitated, but never duplicated, Merrill Lifting Clamps are Drop Forged to give you Safety in Handling and Economy in Operation.



6 SIZES

FEATURING THIS MONTH

LARGE OPENING "G" CLAMP
Designed for lifting and rolling extra heavy and extra thick plates and slabs. Standard 3" ranges to 12". All capacities.

Over 25 Material Handling Devices described in our catalog C-3.

Ask for a copy.

MERRILL BROTHERS

56-74 Arnold Ave., Maspeth, N. Y.

1-60

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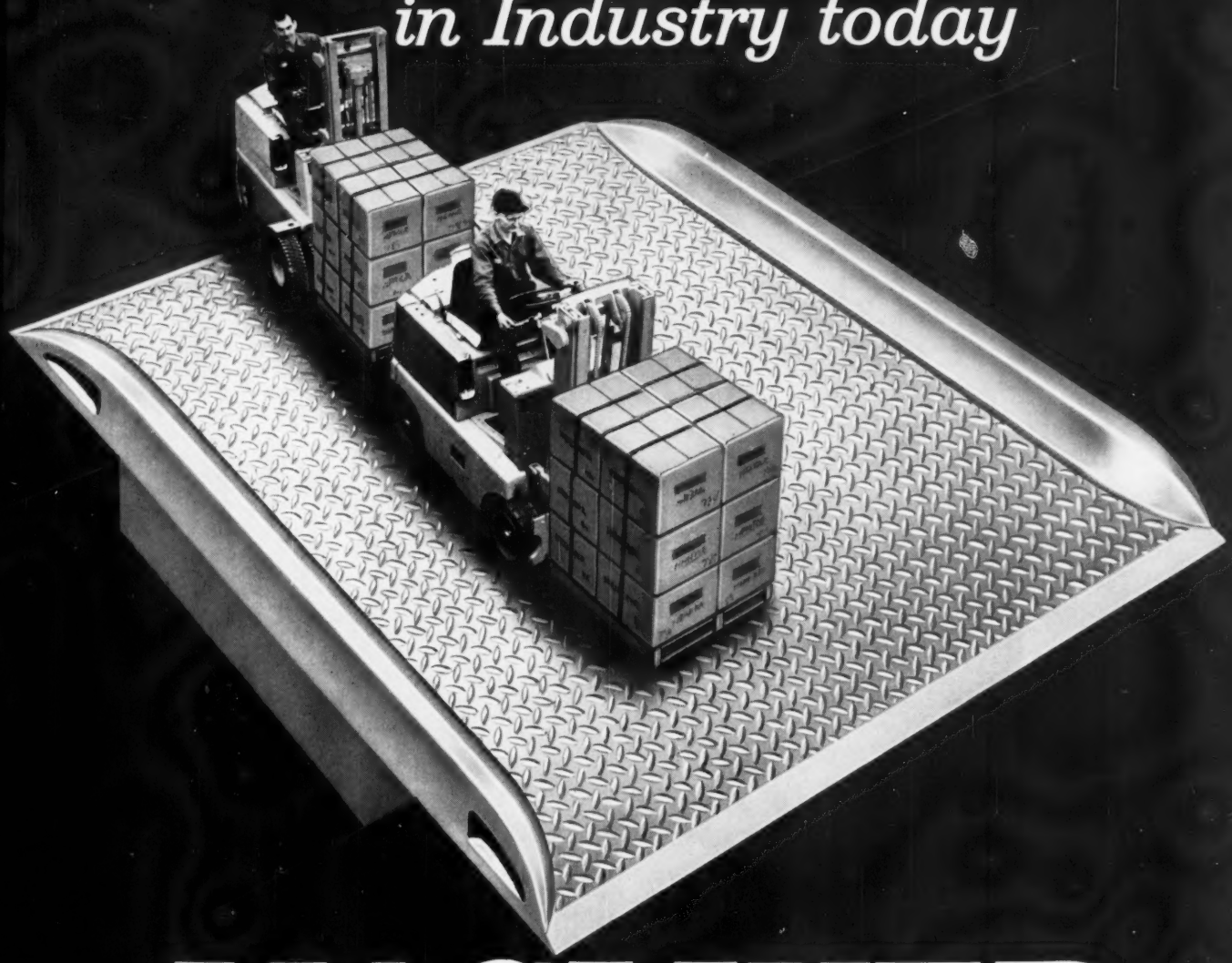
The Big Board

in Industry today



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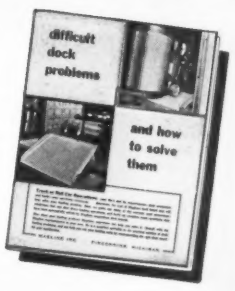

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What is this writer trying to say?

"In instances of mobile applications where fluid temperature due to intermittent operation and continued exposure remains low, a high-viscosity-index, low-pour-point fluid would be mandatory for reliable operation."

What he wants you to know is this:

"Machines used outdoors in winter need oil that isn't affected by the cold."

Well if that's what he meant, why didn't he say so? Good question. The reason you have to hack your way through doubletalk in technical and business magazines is that writing things clearly and simply is hard work—a lot harder and much more expensive than putting them down in technicalese (the special language of engineers and longhairs.) The odd part of this problem is that even the longhairs who *write* technicalese don't like to *read* it. That is why the articles in this magazine have been distilled.

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eliminate unwanted vegetation	kill weeds
It is used to rupture missile frames in flight to initiate aerodynamic disintegration.	It makes missile frames explode in flight.
formation of iron oxide binding the two surfaces	rusted together

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● **HOW WE DEVELOPED DISTILLED WRITING.** First we hired Dr. David Kinsler to head up our distilling on a fulltime basis. He works with all our editorial staffs, teaching sharp, concise writing. Second, we retained Rubert Gunning, the top authority on readable writing, as our consultant. Third, we put every line of copy—whether staff-written or by an expert in the field—through the distilling process before it goes to the printer. Our whole editorial effort is aimed at telling the story brightly, clearly, briefly.

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